TORO. Count on it.

Intelli-Sense TIS-612 • User's Guide

- Setup
- Installation
- Programming
- Operation

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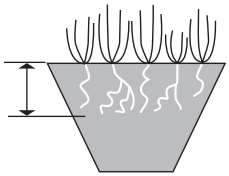
Introduction

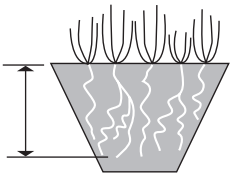
Welcome to the World of Intelli-Sense Irrigation

Research has proven that over-watering is not only costly, but it poses a threat to the environment as well as your landscape investment. Overwatering leads to poor plant health and disease, dramatically increases water bills, depletes precious water supplies and promotes run off that can pollute local watersheds and beaches.

In many cases, landscapes become conditioned to improper irrigation. Plants are prone to develop shallow root systems, making them vulnerable to drought, cold, heat stress and desease. The Toro Intelli-Sense controller is among the world's most proven and reliable weather-based irrigation control solution available. Numerous independent studies have proven that Intelli-Sense coupled with WeatherTRAK technology optimizes landscape health while saving time, money and resources.



A shallow root zone is often promoted by over-watering.



A deep root zone results from properly applied irrigation.

Your Intelli-Sense controller features an advanced scheduling engine that can automatically calculate an accurate irrigation schedule for each watering area based on the specific irrigation needs of your landscape. When linked to the optional WeatherTRAK ET Everywhere service, the watering schedule is automatically adjusted each night so the controller can calculate the exact amount of water needed for the next watering cycle.

Over time, the Intelli-Sense watering control solution reconditions your landscape to a natural balance, leading to healthier plants and greater efficiency in the way they use and absorb water.

What is ET?
ET (Evapotranspiration) is the term used to describe the rate at which moisture is lost to the atmosphere through the surface of the soil (evaporation) and from the exposed surfaces of the plants (transpiration). By comparing the current ET rate to the irrigation needs of the plant and the capacity of the soil to hold water (reservior), the Intelli-Sense can calculate the exact amount of irrigation needed to replenish the soil reservior.

The Intelli-Sense Controller Solution

The Intelli-Sense controller solution includes:

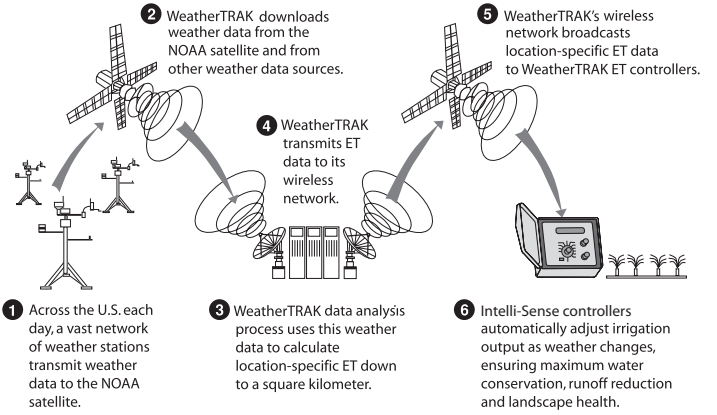
- WeatherTRAK's exclusive irrigation scheduling engine software
- WeatherTRAK ET Everywhere service*
- Toro and WeatherTRAK customer support.

Irrigation Scheduling Engine

Intelli-Sense features WeatherTRAK's fully-integrated scheduling engine software that takes the guesswork out of irrigation system programming. The scheduling engine automatically generates an accurate irrigation program for each station based on specific landscape details such as plant type, soil composition, slope and the type of sprinkler used. With the Intelli-Sense controller solution, your entire landscape recieves pricisely the water it needs to establish and maintain optimal plant health.

WeatherTRAK ET Everywhere Service*

The WeatherTRAK ET Everywhere service delivers current weather-based ET updates via a two-way wireless communication network. WeatherTRAK's patented ET update service collects weather data from more than 14,000 weather stations, including the National Oceanic and Atmospheric Administration (NOAA) network. Proven scientific modeling validates local weather to less than one-half square mile before the data is transmitted to the Intelli-Sense controller.


2 WeatherTRAK downloads weather data from the NOAA satellite and from other weather data sources.
5 WeatherTRAK's wireless network broadcasts location-specific ET data to WeatherTRAK ET controllers.
4 WeatherTRAK transmits ET data to its wireless network.
1 Across the U.S. each day, a vast network of weather stations transmit weather data to the NOAA satellite.
3 WeatherTRAK data analysis process uses this weather data to calculate location-specific ET down to a square kilometer.
6 Intelli-Sense controllers automatically adjust irrigation output as weather changes, ensuring maximum water conservation, runoff reduction and landscape health.

Important:

The WeatherTRAK ET Everywhere subscription service is not included with the purchase of the Intelli-Sense controller. For service setup and subscription information, contact WeatherTRAK customer support at 1-800-362-8774.

Chapter 1
Getting Started

The following checklist provides the basic recommended steps to guide you through the setup, programming and operation of your Intelli-Sense controller:

- ☑ Thoroughly inspect the entire irrigation system to ensure that all sprinklers and valves are working properly and that the water supply is sufficient to operate each sprinkler zone at optimum efficiency.

- ☑ Take some time to read through this manual to become familiar with the various controller components, programming steps, installation procedures, operating features and controller capabilities.

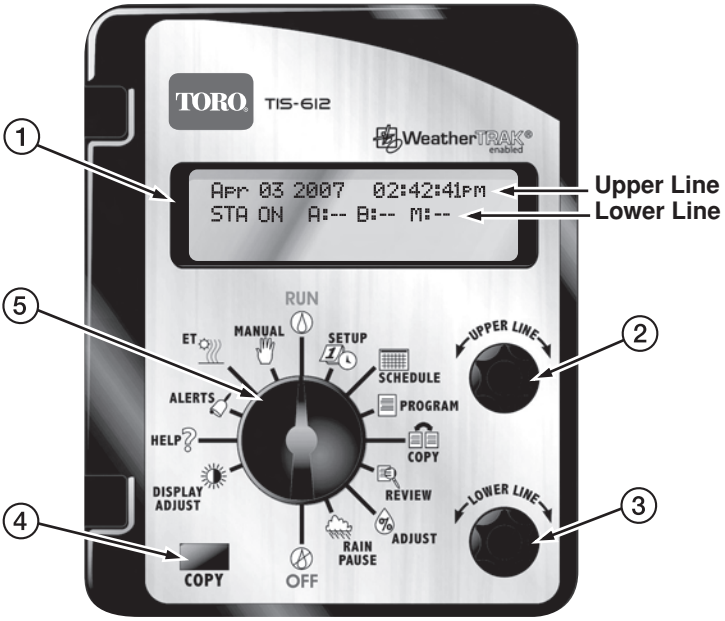
- ☑ Install the controller per the installation instructions provided on pages 71–77.

- ☑ Fill out the Irrigation System and Landscape Detail Worksheet. provided. The information recorded on this worksheet will be used for reference during the setup and programming process as well as the (optional) WeatherTRAK ET Everywhere service activation.

- ☑ Set up and program your controller using the step-by-step procedures beginning with "**Controller Setup**" on page 7.

- ☑ (Optional) Activate the WeatherTRAK ET Everywhere subscription service by calling **1-800-362-8774**.

Control Module Components



1 - Information Display

Large, easy-to-read digital display provides text information for controller setup, programming and operating functions.

2 - Upper Line Dial

Turn this dial left or right to select the menu items that appear on the upper line of the display.

3 - Lower Line Dial

Turn this dial left or right to change the input data that appears on the lower line of the display.

4 - Copy Button

The Copy button is pressed to execute the copy function commands.

5 - Function Dial

Turn this dial left or right to select the various controller functions. A brief description of each function follows on page 5.

Function Dial Positions

- RUN
The normal dial position for automatic operation. Current time/date and controller activity is displayed.

- SETUP
To select and define specific controller setup parameters.

- SCHEDULE
To select and define the watering day schedule for stations using the Fully Automated program mode.

-PROGRAM
To enter specific watering program information required for each station.

- COPY
To transfer program data from one station to another. Enables restoration of default Setup, Schedule and Program settings.

- REVIEW
To review watering program settings for each station.

- ADJUST
To adjust the total applied irrigation to a Fully Automated station zone. Adjustment range: 25% increase to 50% decrease.

- RAIN PAUSE
To suspend automatic watering for a period of 1 to 14 days.

- OFF
To terminate and suspend all watering activity.

- DISPLAY ADJUST
To adjust the display screen contrast.

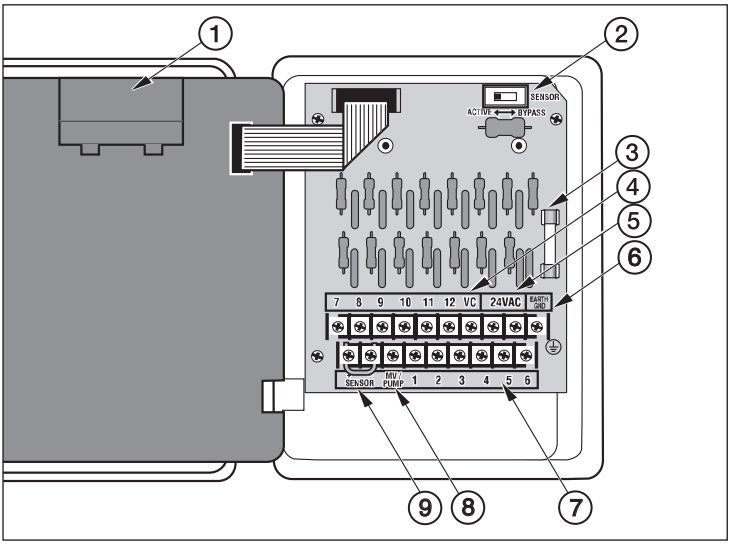
- HELP
To display various Help Menu items for troubleshooting assistance.

- ALERTS
To indicate system problems and operational conflicts.

- ET
To display various ET values and adjust plant coefficient (Kc) factors.

- MANUAL
To manually control station watering operation.

Internal Controller Components



(1) - External Antenna Cable Receptacle Access Cover.

(2) - Rain Sensor Bypass Switch – Enables the rain sensor (if installed) to be manually bypassed.

(3) - Safety Fuse – 2A slow-blow fuse protects controller transformer.

(4) - Valve Common Terminal – For connection of control valve and master valve/pump relay common wire (if installed).

(5) - 24 VAC Terminals – For connection of transformer wires.

(6) - Earth Ground Terminal – For connection of earth ground wire.

(7) - Station Valve Wire Connection Terminals – For connection of 24 VAC irrigation control valve power wires.

(8) - Master Valve/Pump Start Relay Wire Connection Terminal.

(9) - Rain Sensor Connection Terminals – For connection of a Toro rain sensor.

Chapter 2
Controller Setup

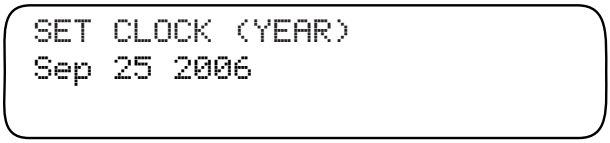
The information entered in the **Setup** function will adapt the controller for operation in your location.
The **Setup** menu consists of the following items:

- **Setting the Clock**
- **Setting the Time Zone**
- **Selecting Auto Daylight Savings**
- **Setting the Active Station Count**
- **Selecting the Master Valve Control Option**
- **Selecting the Stacking Option**
- **Setting the Water District Number**
- **Setting the ET Zone Number**
- **Setting the Maximum Backup ET Value**
- **Setting the ZIP Code**

About Controller Input

As you begin the controller setup procedures, you will find that virtually all controller input is accomplished in the same manner using the **Function Selector**, **Upper Line** and **Lower Line** knobs.

For example, when you turn the **Function Selector** knob to the **SETUP** position, the first item in the **Setup** menu will appear on the upper line of the display. In this case, Set Clock Year will be displayed. The year currently in memory will be displayed on the lower line as shown in the following example:

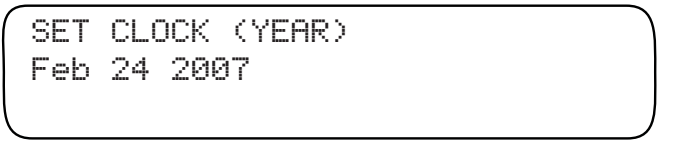


Turning the **Upper Line** knob steps through the various **Setup** menu items (Year, Month, Day, Hour, Minute, Time Zone, etc.). Turning the **Lower Line** knob changes the value of the selected menu item. Any value selection or change you make is entered into the controller memory when the **Upper Lin**e or **Function Selector** knob is turned.

A display prompt, similar the example below, lets you know when you have reached the end of the selected function's menu.

Setting the Clock

1. Turn the **Function Selector** knob to **SETUP**. The first **Setup** menu item is Set Clock (Year).

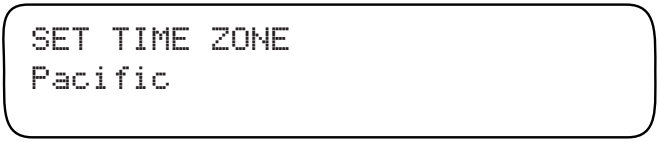


2. Turn the **Lower Line** knob to set the current year.
3. Turn the **Upper Line** knob one click to the right to select the next Setup menu item, Set Clock (Month).
4. Turn the **Lower Line** knob to set the current month.
5. Turn the **Upper Line** knob one click to the right to select Set Clock (Day).
6. Turn the **Lower Line** knob to set the current day.
7. Turn the **Upper Line** knob one click to the right to select Set Clock (Hour).
8. Turn the **Lower Line** knob to set the current hour (**am or pm**).
9. Turn the **Upper Line** knob one click to the right to select Set Clock (Minute).
10. Turn the **Lower Line** knob to set the current minute.

Note: Leave the **Function Selector** knob in the **SETUP** position to continue selecting and setting the remaining **Setup** menu items.

Setting the Time Zone

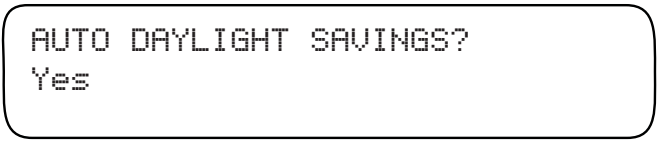
1. Within the **Setup** menu, turn the **Upper Line** knob to view the following display:



2. Turn the **Lower Line** knob to select your time zone from the following choices:
   - **Pacific** (default setting)
   - **Alaska**
   - **Hawaii**
   - **Atlantic**
   - **Eastern**
   - **Central**
   - **Mountain**

Selecting Auto Daylight Savings

1. Within the **Setup** menu , turn the **Upper Line** knob to view the following display:



2. The default selection is **Yes** which enables the controller to automatically compensate for Daylight Savings time. To disable this option, turn the **Lower Line** knob to display **No**.

Setting the Active Station Count

The actual number of stations being used for irrigation must be entered to enable accurate automatic scheduleing. By default, all stations are used in the scheduling computations.

Important:

If the actual number of active stations is not entered, errors and low controller performace can result. Setting the active station count higher than actual will add unnecessary time to the Water Window causing an alert condition to occur. Setting the station count lower than actual will prevent some stations from operating.

Note: The active station count entered in this step will also determine the number of stations that can be accessed within the **Programming**, **Review** and **Copy** function procedures.

1. Within the **Setup** menu, turn the **Upper Line** knob to view the following display:

```
SET ACTIVE STATIONS
10    (MAX AVAILABLE=12)
```

2. The maximum number of active station will be displayed by default. To change the number of active stations, turn the **Lower Line** knob.

Selecting the Master Valve Control Option

Operation of the Master Valve (MV) control circuit can be enabled or disabled as needed. By default the MV circuit is enabled.

1. Witihin the **Setup** menu, turn the **Upper Line** knob to view the following display:

```
SET MASTER VALVE
Enabled
```

2. By default, the Master Valve circuit is **Enabled**. To disable the MV circuit, turn the **Lower Line** knob to select **Disabled**.

Selecting the Stacking Option

When the **Stacking YES** option is selected, the controller will be constrained to operate **one station at a time**. The Water Window start time and duration selected for Automatic Schedule **A** will also be assigned to Automatic Schedule **B** and **U** (User-defined) schedules.

When the **Stacking NO** option is selected, the constraint is removed, allowing up to four stations to operate at the same time. A separate Water Window start time and duration can be set for all schedules.

Important:
Before selecting Stacking NO, ensure that the irrigation system hydraulic capacity and the controller's maximum current draw capacity (1.0A) will not be exceeded if four stations and master valve circuit are operated concurrently.

1. Within the **Setup** menu, turn the **Upper Line** knob to view the following display:

```
STACKING
YES          SCH A Same Times
```

2. **YES** is selected by default. To disable the Stacking option, turn the **Lower Line** knob to select **NO**.

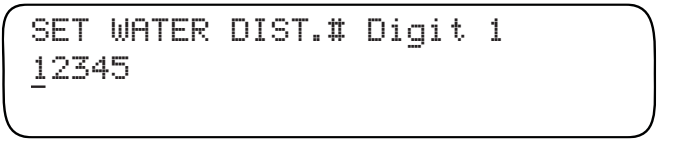
STOP

This completes the Setup procedures required for controller operation. The additional procedures on pages 12 and 13 are used exlcusively for operation with the ET Everywhere service. If you elect to use the subscription service, you will be guided through these procedures by a WeatherTRAK customer support representative at the time of service activation.

Continue now to Chapter 3 - Setting Up Watering Schedules, begining on page 15.

Setting the Water District Number

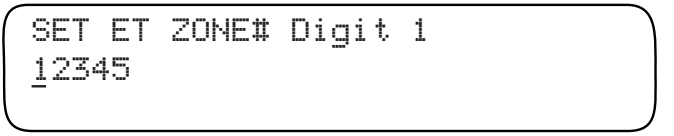
1. Within the **Setup** menu, turn the **Upper Line** knob to view the following display:



2. The underlined digit is selected. To select a different digit, turn the **Upper Line** knob.
3. Turn the **Lower Line** knob to select a value from **0 – 9** for the selected digit of the five-digit number.
4. Repeat steps 2 and 3 to display the **Water District** number.

Setting the ET Zone Number

1. Within the **Setup** menu, turn the **Upper Line** knob to view the following display:



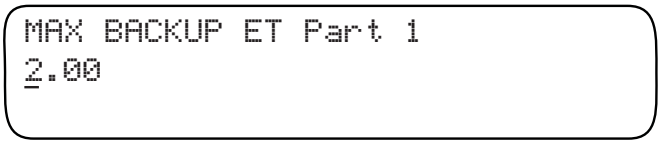
2. The underlined digit is selected. To select a different digit, turn the **Upper Line** knob.
3. Turn the **Lower Line** knob to select a value from **0 – 9** for the selected digit of the five-digit number.
4. Repeat steps 2 and 3 to display the **ET Zone** number.

Setting the Maximum Backup ET Value

The **Maximum Backup ET** value is a failsafe measure used by the controller to calculate daily watering requirments in the event that current ET Everywhere data is not recieved for an extended period.

The Maximum Backup ET default value of **2.00** is automatically entered to help compensate for seasonal weather changes.

1. Within the **Setup** menu, turn the **Upper Line** knob to view the following display:



2. The whole number of the **Maximum Backup ET** value is selected by default. To adjust the value from **1 – 3**, turn the **Lower Line** knob.

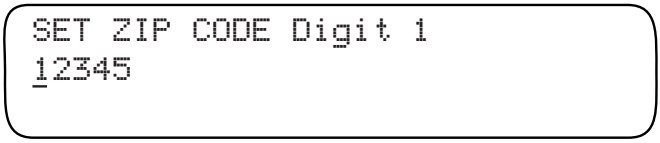
   Note: The **Maximum Backup ET** is adjustable from **0.50 – 3.99**. The whole number is only adjustable to **0** when the decimal number value is **.50** or higher.

3. Turn the **Upper Line** knob right one stop to select the decimal number.

4. Turn the **Lower Line** knob to adjust the decimal number value.

Setting the ZIP Code

1. Within the **Setup** menu, turn the **Upper Line** knob to view the following display:



2. The underlined digit is selected. To select a different digit, turn the **Upper Line** knob.

3. Turn the **Lower Line** knob to adjust the digit from **0 – 9**.

4. Repeat steps 2 and 3 to set the five-digit **ZIP Code** number.

Notes

Chapter 3
Setting Up Watering Schedules

A key component of a station operating program is its watering schedule. Two optional scheduling modes are available: Automatic and User-defined. Within the Automatic mode, two separate schedules (**A** and **B**) can be defined. Within the User-defined (**U**) schedule mode, operation with and without ET data input can be defined. The defined watering schedules will then be assigned to each station within the **Program** fucntion.

The **Schedule** function menu for Automatic and User-defined schedules consists of the following items:

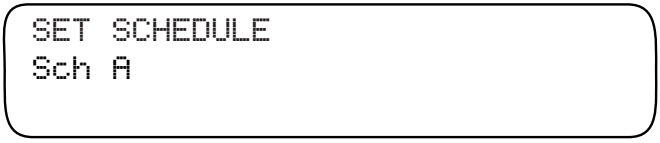
- **Set Schedule** – to select the Schedule mode **A**, **B** or **U**.
- **Set Irrigation Start** – to set the Water Window start time.
- **Set Window Hour** – to set the Water Window duration.

Automatic schedules **A** and **B** are defined with two additional menu items:

- **Set High ET Start** - to set the start time for high ET rate conditions.
- **Select Water Days** - to set the active watering day schedule.

Selecting the Schedule Mode to Define

1. Turn the **Function Selector** knob to **SCHEDULE** to view the following display:



2. Automatic Schedule **A** is selected by default. To select Schedule **B** or **U**, turn the **Lower Line** knob.

Setting the Water Window

The Water Window defines the period of time within an active watering day in which all scheduled watering must occur. Automatic and User-defined operating modes must have an assigned Water Window start time and duration to enable operation.

Important:

When STACKING YES option is selected within the Setup menu, the Water Window defined for Schedule A will also be applied to Schedules B and U.

If STACKING NO option is selected, a separate Water Window be defined for Schedules A, B and U.

1. Within the **Schedule** menu, turn the **Upper Line** knob to view the following display:

```
SET IRR START HOUR SCH A
03:01am
```

2. The default Water Window start time is 3:01 a.m. Turn the **Lower Line** knob to adjust the hour digit(s) and **a.m./p.m**.
3. Turn the **Upper Line** knob right one stop to view the following display:

```
SET IRR START MIN SCH A
03:01am
```

4. Turn the **Lower Line** knob to adjust the minutes digits.
5. Turn the **Upper Line** knob right one stop to view the following display:

```
SET WINDOW HOUR    SCH A
23:00 hrs  (End 11:01pm)
```

6. Turn the **Lower Line** knob to adjust the Water Window duration from **6 – 23** hours.
7. Turn the **Upper Line** knob right one stop to view the following display:

```
SET WINDOW MIN     SCH A
23:00 hrs  (End 11:01pm)
```

8. Turn the **Lower Line** knob to adjust the minutes of duration from **01 – 59**. End time is automatically calculated.

STOP: This completes the User-defined (U) Schedule setup procedure. Continue on page 29 to complete User-defined station programming. For Automatic Schedule setup, continue on page 17.

Setting the High ET Start Time

During periods of higher than normal ET rate, additional watering may be needed to maintain the required soil moisture content, as is typical for shallow-rooted turf during summer months. The start time of this additional watering cycle is set by the **High ET Start Time**

1. Within the **Schedule** menu, turn the **Upper Line** knob to view the following display:

2. The **High ET Start** default time is 1:00 p.m. To adjust the hour, turn the **Lower Line** knob.

   Note: The **High ET Start Time** can only be set in p.m. hours.

3. Turn the **Upper Line** knob right one stop to view the following display:

4. To adjust the minutes, turn the **Lower Line** knob to set **01 – 59** minutes.

Selecting a Watering Day Schedule

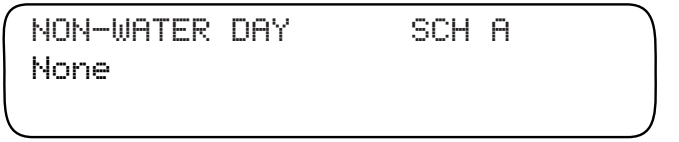
Active watering day schedule can be selected using one of the following scheduling methods:

- **Set By WeatherTRAK** - Watering days selected per current ET data supplied by the WeatherTRAK ET Everywhere service.
- **Odd/Even** - All odd- or all even-numbered days.
- **Interval -** Active days based on a recurrent interval ranging from 01 (every day) to 31 (every 31st day).
- **Days-of-Week -** Specified days of the week for each month.

1. Within the **Schedule** menu, turn the **Upper Line** to view the following display:

2. The **Set by WeatherTRAK** option is selected by default. To use this scheduling method, contunue at step 3 below. To select an alternate scheduling method, turn the **Lower Line** knob to display the desired option, then continue as noted:
   - **Odd/Even Days – below**
   - **Interval – page 19**
   - **Days-of-Week – page 19**

3. Turn the **Upper Line** knob right one stop to view the following display:



4. The defalt setting for a Non-Watering Day is **None**. To prevent watering on a specific day of the week, turn the **Lower Line** knob to display the day abbreviation.

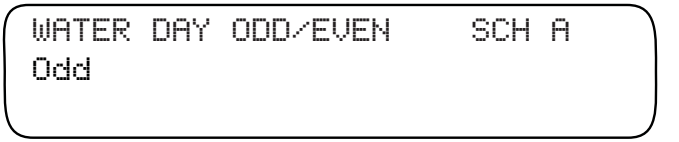
Note: This completes the setup procedure for an watering Automatic schedule. To set up another watering schedule, repeat the setup procedure starting on **page 15**.

Setting an Odd/Even Day Schedule

This watering day schedule option enables all odd-or all even-numbered days to be set as active watering days.

Note: When an Odd day schedule is used, two consecutive watering days will occur at the end of all months with 31 days.

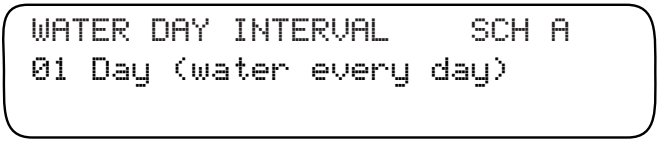
1. Within the **Select Water Days** menu, turn the **Upper Line** knob to view the following display:



2. An **Odd** numbered watering day schedule is selected by default. To select **Even**, turn the **Lower Line** knob.

Setting an Interval Day Schedule

1. Within the **Set Water Days** menu, turn the **Upper Line** knob to view the following display:



2. The default Interval is **01** which schedules every day as active. To select an Interval from **02 – 31**, turn the **Lower Line** knob.

   Note: The current day is the first active day of the Interval schedule. For example, if today is Saturday and a 02 interval (water every-other-day) is set, today will be active. The next active watering day will be Monday.

Setting a Days-of-Week Schedule

This scheduling option enables each day of the week (per month) to be selected to water as needed.

The chart below is provided to help visualize this type of schedule and to use for reference during the programming process.

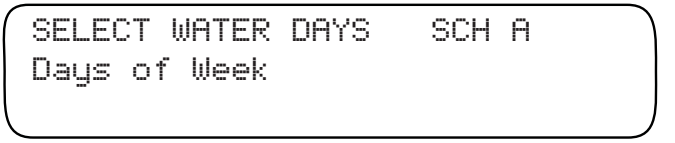
By default, every day is an active watering day (indicated by Y in each square of the chart below). To use this chart for reference, mark each day that you wish to **remove** from the active watering schedule.

Watering Days for Automatic Schedule ____ Date _____

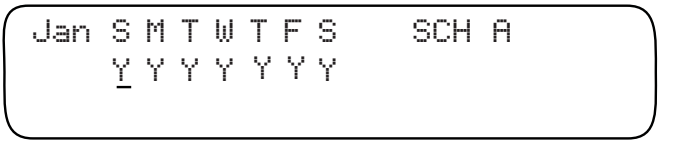
	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Jan.	Y	Y	Y	Y	Y	Y	Y
Feb.	Y	Y	Y	Y	Y	Y	Y
March	Y	Y	Y	Y	Y	Y	Y
April	Y	Y	Y	Y	Y	Y	Y
May	Y	Y	Y	Y	Y	Y	Y
June	Y	Y	Y	Y	Y	Y	Y
July	Y	Y	Y	Y	Y	Y	Y
Aug.	Y	Y	Y	Y	Y	Y	Y
Sept.	Y	Y	Y	Y	Y	Y	Y
Oct.	Y	Y	Y	Y	Y	Y	Y
Nov.	Y	Y	Y	Y	Y	Y	Y
Dec.	Y	Y	Y	Y	Y	Y	Y

Note: When the Intelli-Sense is operating in an ET-controlled mode, it will attempt to run irrigation on all active days as needed. During months of low ET rate, some active days may be skipped. While in the summer months with a high ET rate, every scheduled active day may be needed to provide the required amount of irrigation. If too few active days are available for the required amount of irrigation, Day Pattern alert will result. To resolve this condition, refer to "**Day Pattern Alert**" information on page 56.

1. Within the **Select Water Days** menu, turn the **Lower Line** knob to view the following display:



2. Turn the **Upper Line** knob to the right to display day schedule per month.



3. To remove a day from the schedule, turn the **Upper Line** knob to select (underline) the day.

   Note: Moving the underline past Saturday will advance the display to the next month in sequence.

4. Turn the **Lower Line** knob to replace the Y with a dash (–). In the example below all Fridays in January are excluded for Schedule A.

5. Repeat steps 2 – 4 for all remaining months.

Note: To set up another watering schedule, repeat all steps starting on page 15.

Chapter 4
Setting Up Station Programs

Within the **Schedule** function, watering schedules were set up for **Automatic** and/or **User-defined** operation. Now, within the **Program** function, the remaining setup requirements for controller operation are completed.

Note: To complete the station programming procedures for **Automatic** operation, continue on this page, for **User-defined** station programming, continue on page **29**.

Automatic Station Programming

When a station is programmed for automatic operation, the controller calculates a baseline irrigation program suited to the specific irrigation system and landscape parameters selected.

If the ET Everywhere service is activated, current ET data is downloaded to the controller each night to provide real-time data used by the controller to recalculate and optimize the baseline watering program for the next scheduled watering day.

The Program menu items required to complete an Automatic watering program are as follows:

- **Set Schedule**
- **Use Water Window**
- **Select Srinkler Type**
- **Precipitation Rate***
- **Sprinkler Efficiency***
- **Select Soil Type**
- **Select Plant Type**
- **Set Root Depth***
- **Set Microclimate**
- **Set Slope Factor**
- **Set Sprinkler Location**
- **Set Usable Rainfall**

As you can see by this list, many factors are required by the controller'scheduling engine to formulate an accurate baseline watering schedule. To simplify this procedure, the Intelli-Sense is ready to make some of the decisions for you. The items listed with an asterisk (*) have default values entered automatically based on selections made in preceding steps.

Selecting the Station to Program

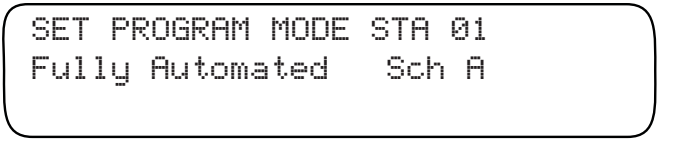
1. Turn the **Function Selector** knob to **PROGRAM** to view the following display:

2. Station 1 is automatically selected. To change the station number, turn the **Lower Line** knob.

   Note: The number of active stations defined in the **Setup** function, determines the number of stations that can be selected.

Selecting the Program Mode

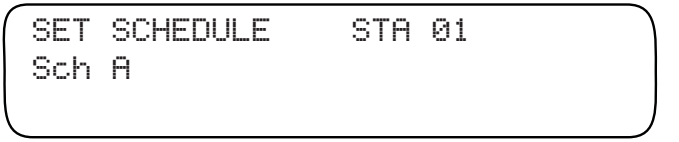
1. Within the **Program** menu, turn the **Upper Line** knob to view the following display:



2. The **Fully Automated** mode is selected by default. If it is not displayed, turn the **Lower Line** knob to select this mode.

Selecting the Program Schedule

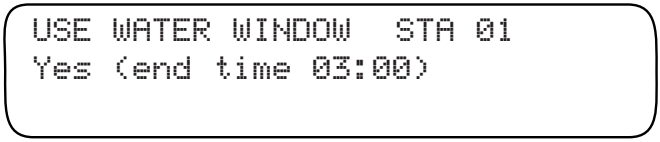
1. Within the **PROGRAM** menu, turn the **Upper Line** knob to view the following display:



2. Automatic Schedule **A** is selected by default. To select Automatic Schedule **B**, turn the **Lower Line** knob.

Selecting the Water Window Option

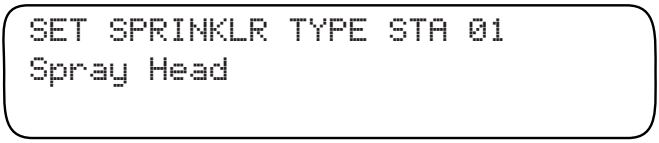
1. Within the **Program** menu, turn the **Upper Line** knob to view the following display:



The **Yes** option (use Water Window) is selected by default. The displayed Water Window end time corresponds to the Water Window parameters set in the **Schedule** function. To disable the Water Window for the selected station, turn the **Lower Line** knob to select the **No** option.

Selecting the Sprinkler Type

1. Within the **Program** menu, turn the **Upper Line** knob to view the following display:



2. Spray Head (fixed spray) is selected by default. Turn the **Lower Line** knob to select on of the appropriate sprinkler type.

- **Full Circle Rotor**
- **Part Circle Rotor**
- **Mixed Rotors**
- **Full Circle Impact**
- **Part Circle Impact**
- **Mixed Impacts**
- **Stream Rotors**
- **Bubbler**
- **Drip Emitter**
- **Stream Spray**

Setting the Precipitation Rate

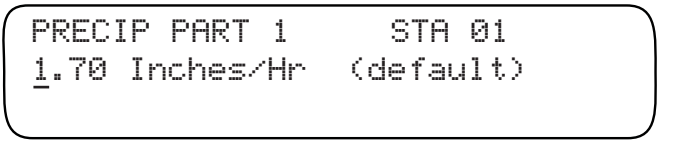
Important:

The sprinkler precipitation rate (PR) is a key factor in the calculation of an automatic watering program. If you know the actual PR value, enter it at this time.

If you do not have this information, the baseline PR of the sprinkler type (entered in the previous step) will be used.

Note: For additional information regarding PR value calulation methods, see "**Gathering Site Data**" on page **79**.

1. Within the **Program** menu, turn the **Upper Line** knob to view the following display:



2. The default **PR** value will be displayed for the sprinkler type selected. The whole number is selected by default. Turn the **Lower Line** knob to adjust the value from **0 – 9**.

   Note: The PR value is adjustable from **0.10 – 9.90**. The whole number value is only adjustable to **0** when the decimal number value is **0.10** or higher.

3. Turn the **Upper Line** knob right one stop to select the decimal number.

4. Turn the **Lower Line** knob to adjust the decimal number value.

Setting the Efficiency Value

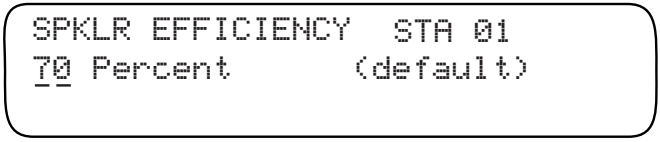
Like the sprinkler's PR, the **Efficiency** value is a key factor required by the controller's scheduling engine to calculate an efficient watering program for each station. The controller will automatically enter an Efficiency value based on the type of sprinkler selected for the station.

Changing the **Efficiency** value will alter overall station watering operation as follows:

▲ **Increasing** the **Efficiency** value (sprinkler performance is above average) **decreases** overall watering.

▼ **Decreasing** the **Efficiency** value (sprinkler performance is below average) **increases** overall watering.

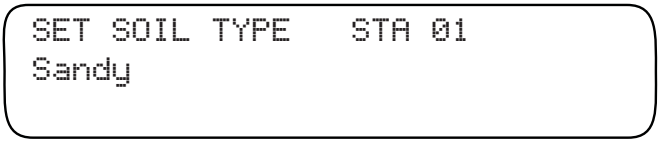
1. Within the **Progam** menu, turn the **Upper Line** knob to view the following display:



2. The default Efficiency value is displayed for the sprinkler type selected. To change the value, turn the **Lower Line** knob to adjust the value from **10 – 95**%.

Selecting the Soil Type

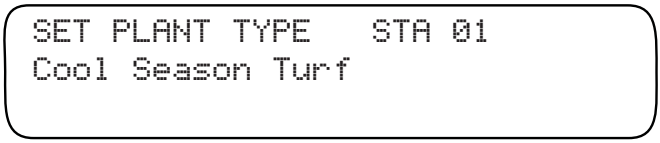
1. Within the **Progam** menu, turn the **Upper Line** knob to view the following display:



2. The default Soil type is Sandy. To change the Soil type, turn the **Lower Line** knob to select from the following choices:
   - **Sandy Loam** (more sand than clay)
   - **Loam** (equal proportion of sand and clay)
   - **Clay Loam** (more clay than sand)
   - **Clay**

Selecting the Plant Type

1. Within the **Progam** menu, turn the **Upper Line** knob to view the following display:



2. The default Plant type is **Cool Season Turf**. To change the Plant type turn the **Lower Line** knob to select from the following choices:
   - **Cool Season Turf**
   - **Warm Season Turf**
   - **Combined Turf**
   - **Flowers**
   - **Trees**
   - **Shrubs - High Water Use**
   - **Shrubs - Medium Water Use**
   - **Shrubs - Low Water Use**
   - **Mixed - High Water Use**
   - **Mixed - Medium Water Use**
   - **Mixed - Low Water Use**
   - **Native Shrubs/ Trees**
   - **Native Grasses**
   - **Custom Plant A**
   - **Custom Plant B**
   - **Custom Turf**

Setting the Root Depth

1. Within the **Program** menu, turn the **Upper Line** knob to view the following display:

```
SET ROOT DEPTH   STA 01
06 Inches      (default)
```

2. The default root depth will be displayed for the soil type and plant type previously selected. To change the depth, turn the **Lower Line** knob to adjust from **2 – 36** inches.

   Changing the **Root Depth** value will alter overall station watering operation as follows:

   ▲ **Increasing** the **Root Depth** value (root depth is greater than average), **increases** overall watering.

   ▼ **Decreasing** the **Root Depth** value (root depth is less than average), **decreases** overall watering.

Selecting the Microclimate

The station **Microclimate** value factors in the average amount of exposure to sunlight and shade throughout the day. One of four provided **Microclimate** values is selected that best describes the average conditions. The **Microclimate** values are as follows:

- **Sunny All Day** = Sun for 7 to 8 hours per day – no change to the calculated ET rate.
- **Sunny Most of the Day** = Sun for 4 to 6 hours per day – decreases watering by 10% of calculated ET rate.
- **Shady Most of the Day** = Shady for 4 to 6 hours per day – decreases watering by 20% of calculatd ET rate.
- **Shady All Day** = Shady for 7 to 8 hours per day – decreases watering by 30% of calculated ET rate.

1. Within the **PROGRAM** menu, turn the **Upper Line** knob to view the following display:

```
SET MICROCLIMATE   STA 01
Sunny All Day
```

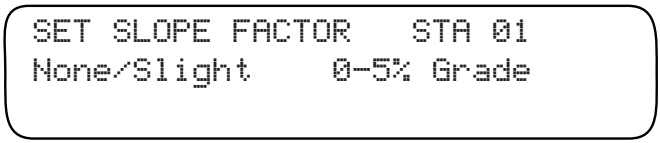
2. **Sunny All Day** is selected by default. To select one of the alternate Microclimate descriptions, turn the **Lower Line** knob.

Selecting the Slope Factor

The **Slope Factor** is an important component used in the automatic watering program calculation to determine the amount of run time and number of repeat cycles required per watering day. One of five provided **Slope Factors** is selected that best describes the average conditions. The **Slope Factors** are as follows:

- **None/Slight 0 – 5% Grade**
- **Gentle 6 – 8% Grade**
- **Mild 9 – 12% Grade**
- **Moderate 13 – 20% Grade**
- **Steep >20% Grade**

1. Within the **PROGRAM** menu, turn the **Upper Line** knob to view the following display:



2. **None/ Slight (0 –5%)** grade is selected by default. To select an alternate **Slope Factor**, turn the **Lower Line** knob.

   Note: A **Slope Factor** of **None/Slight** does not alter the watering program calculation.

   Increasing the **Slope Factor** beyond 5% will result in **decreasing** the watering run time per cycle and **increasing** the number of watering cycles per day.

Selecting the Sprinkler Location (on slope)

Note: If a **Slope factor** of **None/Slight** has been selected, this setting is not enabled.

1. Within the **Program** menu, turn the **Upper Line** knob to view the following display:

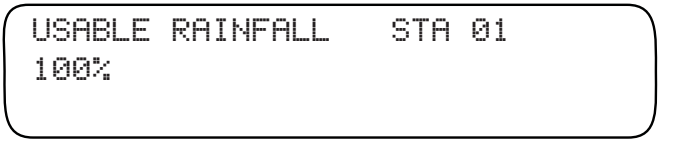
2. **None, No Slope Set** is selected by default. To choose an alternate Sprinkler Location, turn the **Lower Line** knob to select one of the following options:
   - **All Parts of Slope** (default if Slope is other than None)
   - **Top of Slope**
   - **Middle of Slope**
   - **Bottom of Slope**

Selecting the Usable Rainfall

The amount of watered area exposed to rainfall determines the the **Usable Rainfall** setting of **100**% or **None**. For example, a planter that is blocked from rainfall by a roof overhang would have a **Usable Rainfall** value of **None**. An open lawn area with no obstructions would be have a **Usable Rainfall** value of **100**%.

Note: When **None** is selected, the station will continue to operate during a watering delay period initiated by **Rain Pause** or an active **Rain Sensor**.

1. Within the **Program** menu, turn the **Upper Line** knob to view the following display:

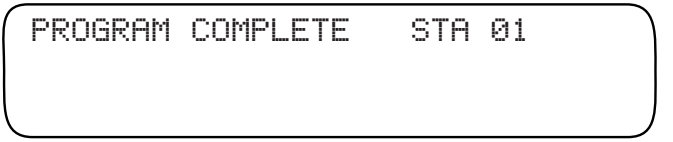


2. **100**% is select by default. To adjust the value to **None**, turn the **Lower Line** knob.

   Note: Additional percentage factors of 25%, 50% and 75% displayed between None and 100% apply only to systems utilizing the (optional) WeathTRAK Rain Service.

Completing Automatic Programming

1. Within the **Program** menu, turn the **Upper Line** knob to view the following display:



2. Turn the **Upper Line** knob to continue programming the stations. The next station number in sequence will be selected. To select a different station number, turn the **Lower Line** knob.
3. Repeat the programming process for each station as needed.

Important:

If there are other stations remaining to be programmed that will use the same or similar program set up, the COPY function can be used to transfer the complete program setup information from one station to another or to all stations at the same time. Minor program changes to individual stations can then be made quickly and easily.

See "Using the Copy Function" on page 38 for detailed information.

User-defined Station Programming

Within the **User-defined** programming mode are two format options: **User - With ET** and **User - No ET**. Both formats require the same basic setup process, with the exception that **User - With ET** mode enables a **Reference ET** value to be selected.

When the **User - With ET** option is used, the station's baseline watering progam is updated daily by the ET Everywhere service and adjusted automatically to suit current ET conditions.

When the **User - No ET** option is used, the station's watering progam remains constant, without regard to changes in ET rate.

A baseline watering program is established for the station using the following **User - defined** setup parameters:

- **Water Window Option**
- **Cycle Time**
- **Number of Cycles per day**
- **Soak Time**
- **Watering Day Schedule**
- **Reference ET (User - With ET format only)**

Selecting the Station to Program

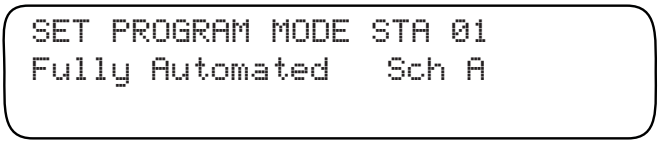
1. Turn the **Function Selector** knob to **PROGRAM** to view the following display:

2. Station 1 is automatically selected. To change the station number, turn the **Lower Line** knob.

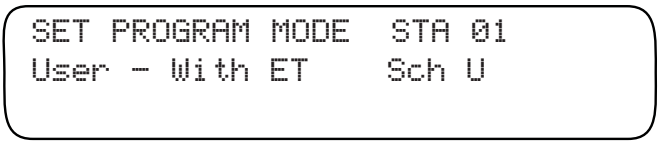
   Note: The number of active stations defined in the **Setup** function, determines the number of stations that can be selected.

Selecting the Program Mode

1. Within the **Program** menu, turn the **Upper Line** knob to view the following display:

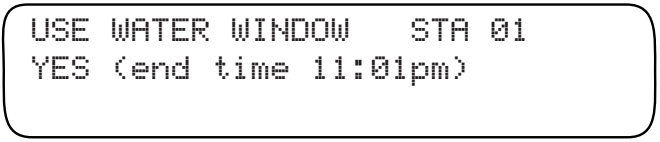


2. **Fully Automated** mode is selected by default. Turn the **Lower Line** knob to select the **User - With ET** or **User - No ET** option as shown in the example below:



Selecting the Water Window Option

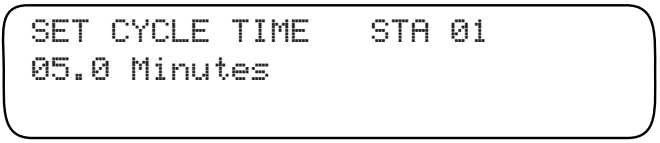
1. Within the **Program** menu, turn the **Upper Line** knob to view the following display:



2. The **Use Water Window- YES** option is selected by default. To select **NO**, turn the **Lower Line** knob.

Setting the Cycle Time

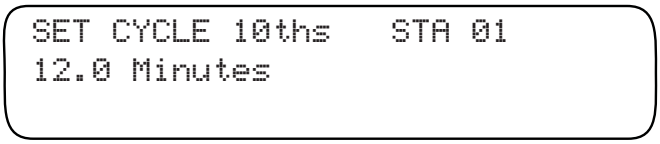
1. Within the **Program** menu, turn the **Upper Line** knob to view the following display:



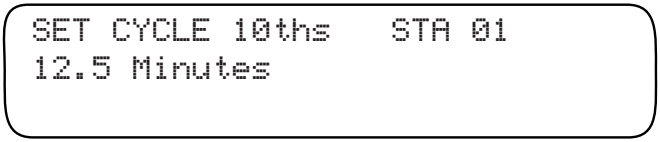
2. The station **Cycle Time** is set to **5** minutes by default. To adjust the the cycle time from **00 – 99** minutes, turn the **Lower Line** knob.

   Note: Adjusting the **Cycle Time** to **00** will disable the station from automatic operation.

3. Turn the Upper Line knob right one stop to select the following display:

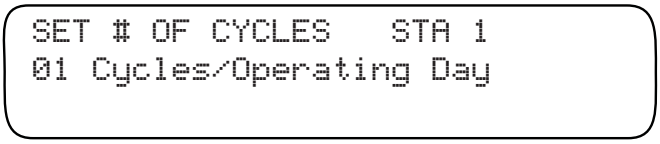


4. The station Cycle time 10ths is set to 0 by default. To adjust the cycle time 10ths digit from **.0 – .9**, turn the **Lower Line** knob as shown in the example below.



Selecting the Number of Watering Cycles

1. Within the **Program** menu, turn the **Upper Line** knob to view the following display:



2. The number of watering cycles per active day is set to 1 by default. To adjust the number from **0 – 20** cycles per day, turn the **Lower Line** knob.

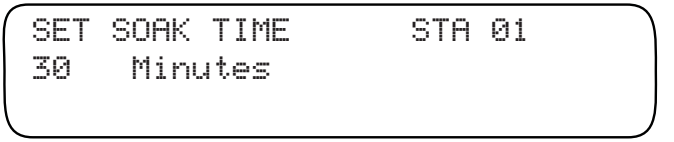
   Note: Adjusting the number of cycles per day to **00** will disable the station from automatic operation.

Setting the Soak Time

Soak time is an adjustable delay period that is placed between station watering cycles. The delay time enables irrigation water to soak into the soil to avoid pooling, runoff and possible erosion.

Note: The Soak time entered is actually the minimum delay period. The actual soak time may be longer due to programming variables of other stations scheduled to operate on the same day.

1. Within the **Progam** menu, turn the **Upper Line** knob to view the following display:



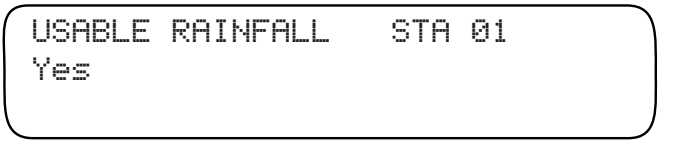
2. The default Soak time is **30** minutes. To adjust the soak time from **00-480** minutes, turn the **Lower Line** knob.

Setting the Usable Rainfall

The amount of watered area **not** restricted from rainfall determines the Usable Rainfall setting. For example, a planter next to the house may be completely blocked from rain by the roof overhang. In this case, the **None** option should be selected. An exposed lawn area with no obstructions would have the **YES** option selected.

Note: When the **None** option is selected, the station will continue to operate as programmed during a watering delay period initiated by the **Rain Pause** function or an active **Rain Sensor**.

1. Within the **Program** menu, turn the **Upper Line** knob to view the following display:



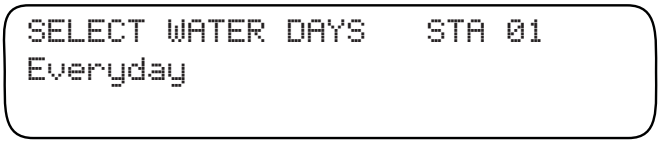
2. The **Yes** option is selected by default. To select **None**, turn the **Lower Line** knob.

Selecting a Watering Day Schedule

Active watering days can be selected for each station using one of the following scheduling methods:

- **Everyday** - Every day of the year is active
- **Odd/Even** - All odd- or even-numbered days are active
- **Interval -** Active days based on a recurrent interval from 01 (every day) to 31 (every 31st day)
- **Set Days** - Specific days of the week per month are active.

1. Within the **PROGRAM** menu, turn the **Upper Line** knob to view the following display:

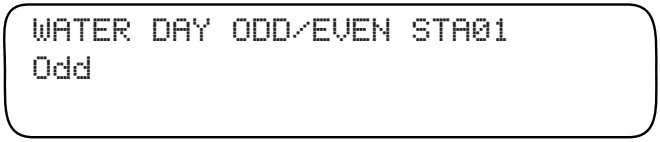


2. The **Everyday** scheduling option is selected by default. To choose an alternate scheduling method, turn the **Lower Line** knob.

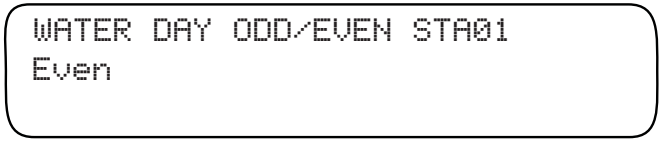
   Note: If the **Everyday** schedule is used, **continue on page 36**.
   If the **Odd/Even** schedule is selected, **continue below**.
   If the **Interval** schedule is selected, **continue on page 34**.
   If a **Set Days** schedule is selected, **continue on page 34**.

Setting an Odd/Even Day Schedule

1. Turn the **Upper Line** knob to view the following display:



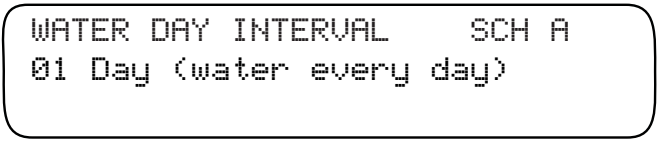
2. An **Odd** day schedule is selected by default. To select an **Even** day schedule, turn the **Lower Line** knob right one stop to view the following display:



3. Continue on page **36**.

Setting an Interval Day Schedule

1. Within the **Set Water Days** menu, turn the **Upper Line** knob to view the following display:



2. The default Interval is **01** which schedules every day as active. To select an Interval from **02 – 31**, turn the **Lower Line** knob.

   Note: The current day is the first active day of the Interval schedule. For example, if today is Saturday and a 02 interval (water every-other-day) is set, today will be active. The next active watering day will be Monday.

Setting a Days-of-Week Schedule

This scheduling option enables each day of the week (per month) to be selected to water as needed.

The chart below is provided to help visualize this type of schedule and to use for reference during the programming process.

By default, every day is an active watering day (indicated by Y in each square of the chart below). To use this chart for reference, mark each day that you wish to **remove** from the active watering schedule.

Watering Days for Automatic Schedule ____ Date _____

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Jan.	Y	Y	Y	Y	Y	Y	Y
Feb.	Y	Y	Y	Y	Y	Y	Y
March	Y	Y	Y	Y	Y	Y	Y
April	Y	Y	Y	Y	Y	Y	Y
May	Y	Y	Y	Y	Y	Y	Y
June	Y	Y	Y	Y	Y	Y	Y
July	Y	Y	Y	Y	Y	Y	Y
Aug.	Y	Y	Y	Y	Y	Y	Y
Sept.	Y	Y	Y	Y	Y	Y	Y
Oct.	Y	Y	Y	Y	Y	Y	Y
Nov.	Y	Y	Y	Y	Y	Y	Y
Dec.	Y	Y	Y	Y	Y	Y	Y

1. Within the **PROGRAM** menu, turn the **Upper Line** knob to view the following display:

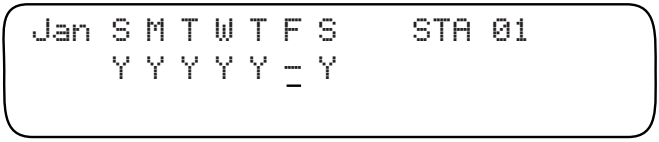
2. The **Set Days** scheduling option is selected by default. To select an alternate scheduling method, turn the **Lower Line** knob.
3. Turn the **Upper Line** knob to the right to select the following display:

Note: By default, all days of all months are active. The month of January is displayed first. The letter **Y** below the day abbreviation indicates the day is active.

4. To remove a day from the schedule, place the line under the appropriate day abbriviation by turning the **Upper Line** knob.

Note: Moving the line past Saturday will advance the display to the next month in sequence.

5. Turn the **Lower Line** knob to replace the **Y** with a dash (–).



In this example, Station 1 will water every day in January except on Fridays.

6. Repeat steps 3, 4 and 5 for all remaining months.

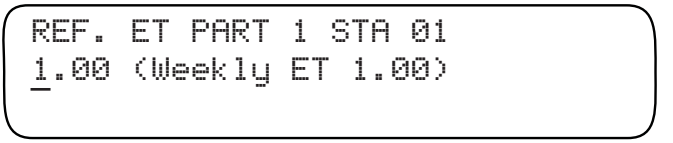
STOP:
This completes the program setup process for the User-No ET schedule format. To program additional stations, return to the beginning of Chapter 4 on page 21.

If a User-With ET schedule fomat is selected, continue on page 36 to complete the setup process.

Setting a Reference ET Value

By setting a **Reference ET** value based on the highest ET demand period of the year, proper watering is ensured for the entire year.

1. Turn the **Upper Line** knob to view the following display:



2. The whole number of the **Reference ET** value is selected by default. To adjust the value from **1 – 3**, turn the **Lower Line** knob.

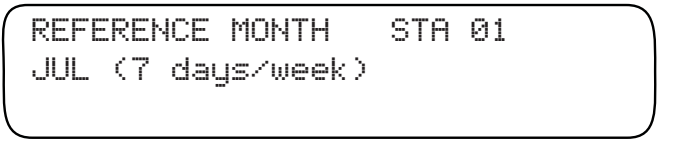
   Note: The **Reference ET** value is adjustable from **0.50 – 3.99**. The whole number is only adjustable to **0** when the decimal number value is **.50** or higher.

3. Turn the **Upper Line** knob right one stop to select the decimal number.

4. Turn the **Lower Line** knob to adjust the decimal number value.

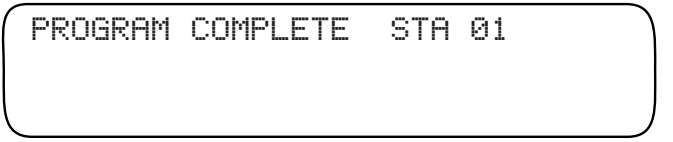
   Note: If the selected station number uses the **Set Days** water day schedule, **Reference Month** menu item will be accessable. To adjust this setting, continue at step 5.
   If the **Set Days** schedule is not used, continue at step 7.

5. Turn the **Upper Line** knob to view the following display:



6. Turn the **Lower Line** knob to change the month.

7. Turn the **Upper Line** knob to view the following display:



STOP:
This completes the program setup process for a User-With ET schedule format. To program additional stations, repeat the programming steps beginning of Chapter 4 on page 29.

Chapter 5
Control Functions

The **Setup**, **Schedule** and **Program** functions enable you to set up an automatic watering schedule designed specifically for your landscape. The **Control Functions** provide enhanced control capabilities of your irrigation system, enabling you to perform various operations such as, program data copy, review, fine-tuning to resolving actual and potential irrigation problems as well as providing a means of manually opetating the system.

Within this chapter you will find detailed instructions provided for each of the following **Control Functions:**

- **COPY**
- **REVIEW**
- **ADJUST**
- **RAIN PAUSE**
- **OFF**
- **DISPLAY ADJUST**
- **HELP**
- **ALERTS**
- **ET**
- **MANUAL**
- **RUN**

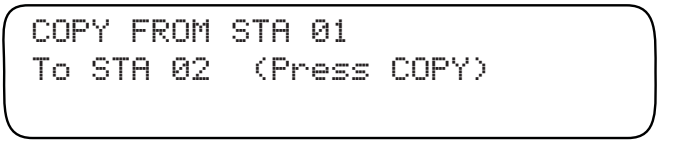
Using the Copy Function

The **Copy** function provides a convenient method of transferring all watering program information from one station to another or to all active stations simultaniously. Minor changes can then be made to each station as needed, greatly simplifying the process of programming several stations with similar watering progam attributes.

The **Copy** function also serves as a means of quickly resetting all user-defined **Setup**, **Schedule** and **Program** settings back to the factory-default values. The default values can be reapplied to selected stations or all stations simultaniously as needed.

Copying Station Information

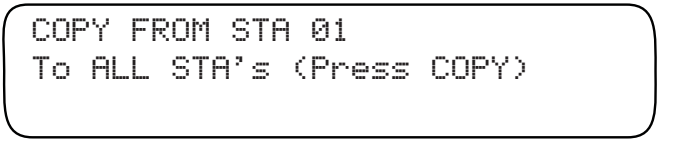
1. Turn the **Function Selector** knob to **COPY** to view the following display:



2. Turn the **Upper Line** knob to select the source station number.

   Note: The number of active stations defined in the **Setup** function, determines the number of stations that can be selected.

3. Turn the **Lower Line** knob to select the destination station number. To select **All Stations**, turn the **Lower Line** knob one stop past the highest station number, as shown in the following display:

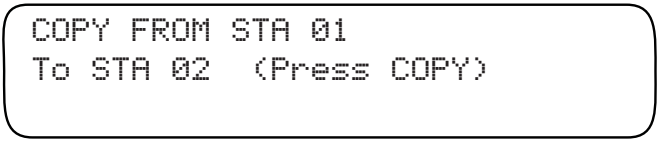


4. Press and hold the **COPY** button. Release the button when COPYING DONE! is displayed.

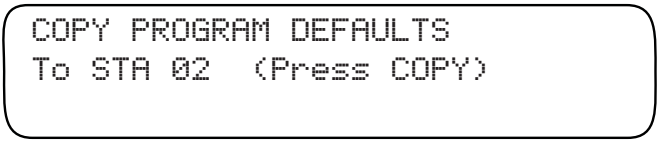
Restoring Station PROGRAM Function Default Values

Important:
Restoring the station Program default values erases all user-defined values and settings for the selected station(s).

1. Turn the **Function Selector** knob to **COPY** to view the following display:

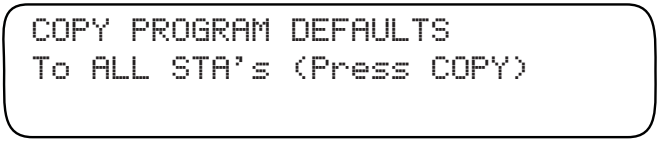


2. Turn the **Upper Line** knob right one stop past the highest station number to view the following display:



3. Turn the **Lower Line** knob to select the station number to be restored.

4. To select **All Stations**, turn the **Lower Line** knob one stop past the highest station number, to view the following display:



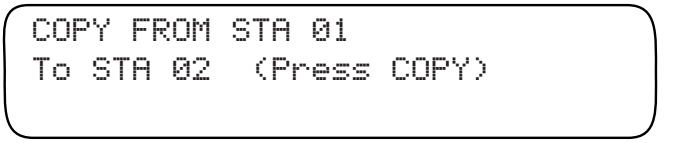
Note: The number of active stations defined in the **Setup** function, determines the number of stations that can be selected.

5. Press and hold the **COPY** button. Release the button when COPYING DONE! is displayed.

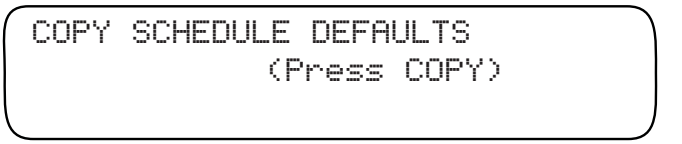
Restoring SCHEDULE Function Default Values

Important:
Restoring the controller Schedule default values erases all user-defined values and settings within this function.

1. Turn the **Function Selector** knob to **COPY** to view the following display:



2. Turn the **Upper Line** knob right one stop past Program defaults to select **Schedule** defaults as shown in the following display:

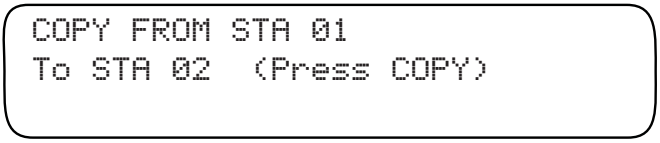


3. Press and hold the **COPY** button. Release the button when COPYING DONE! is displayed.

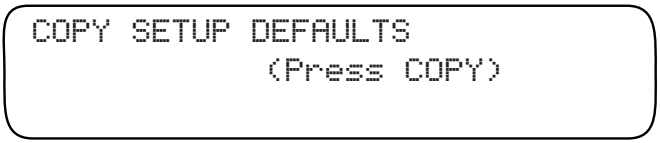
Restoring SETUP Function Default Values

Important:
Restoring the controller Setup default values erases all user-defined values and settings within this function.

1. Turn the **Function Selector** knob to **COPY** to view the following display:



2. Turn the **Upper Line** knob right one stop past Schedule defaults to select the **Setup** defaults as shown in the following display:

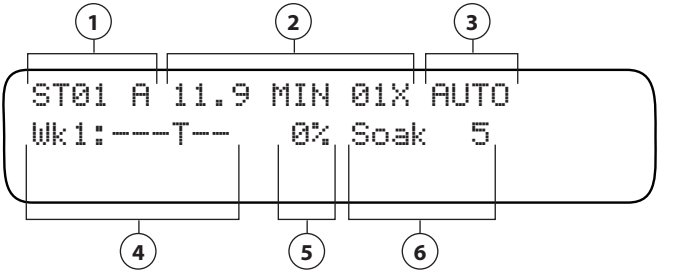


3. Press and hold the **COPY** button. Release the button when COPYING DONE! is displayed.

Using the Review Function

The **Review** function provides a convenient, at-a -glance overview of the watering progam values currently set for each active station. The review information is displayed in an abbrevieated format that allows virtually all current values and settings to viewed in one screen.

1. Turn the **Function Selector** knob to **REVIEW** to view the following display:



2. Station 1 will be selected by default. To select a different station to review, turn the **Upper Line** knob.

The abbreviated data shown in the example above represents the following watering program information currently set for Station 1:

(**1**) Station number 1 is assigned to watering Schedule A.
(**2**) The station will water for 11.9 minutes, one time per day.
(**3**) The station is assigned to the Automatic program mode.
(**4**) The active watering day schedule for Week 1 is Thursday.*
(**5**) The percentage Adjust factor is 0%.
(**6**) Soak time is set for 5 minutes.

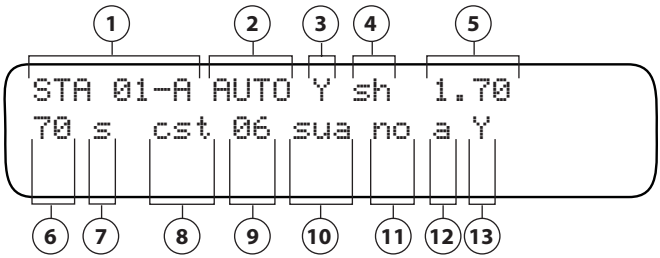
***Note:** The remainder of the 8-week watering day schedule can be reviewed by turning the **Lower Line** knob.

Additional review information can be acquired for each station by pressing the COPY button while the **Fucntion Selector** knob is in the **PROGRAM** position. To use this review option:

1. Turn the **Function Selector** knob to **PROGRAM t**o view the following display:

2. Station 1 is selected by default. To select a different station number to review, turn the **Lower Line** knob.

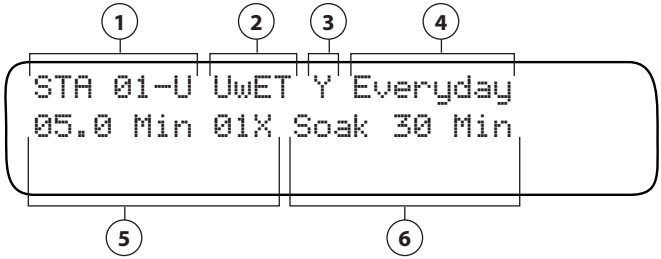
3. Press and hold the COPY button. The station review information wll be displayed similar to the following example:



The abbreviated data shown in this example represents the following watering program information currently set for Station 1 when set to the **Automatic** program mode:

(**1**) Station number 1 is assigned to watering Schedule A.
(**2**) The station is assigned to the Automatic program mode.
(**3**) The Water Window option is selected (Yes).
(**4**) Sprinkler type selected is Spray Head (sh) .
(**5**) Precipitation rate value is set at 1.70.
(**6**) Sprinkler efficiency value is set at 70%.
(**7**) Soil type selected is Sandy.
(**8**) Plant material selected is Cool Season Turf.
(**9**) Root depth is set at 6 inches.
(**10**) Location is Sunny All Day.
(**11**) Slope factor is none.
(**12**) Sprinklers are located on All parts of the slope.
(**13**) Usable Rainfall option is Yes (% factor shown if less than 100%).

The review screen example below represents the watering program information for Station 1 when set to a **User** program mode:



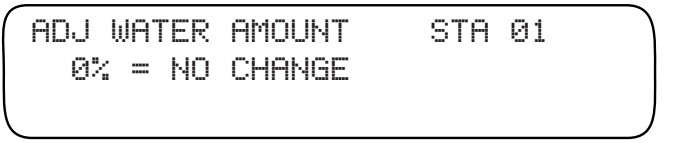
(**1**) Station number 1 is assigned to watering Schedule U.
(**2**) The station is assigned to the User with-ET program mode.
(**3**) The Water Window option is selected (Yes).
(**4**) The active watering day schedule is Everyday.
(**5**) The station will water for 5 minutes one time per day.
(**6**) Soak time is set for 30 minutes.

Using the Adjust Function

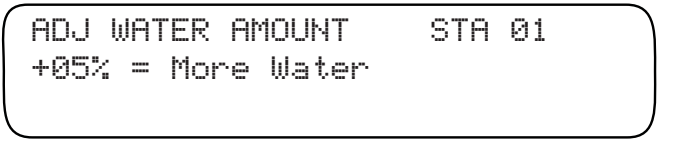
The **Adjust** function provides a convenient method of fine-tuning a station watering program to correct for over- or under-watering. The sum watering program of any station can be easily adjusted for a 25% increase or a 50% decrease in 5% increments. All programnming factors that determine how long and how often the station operates are instantly recalculated and adjusted.

1. Turn the **Function Selector** knob to **ADJUST** to view the following default display:

2. Turn the **Upper Line** knob to select the desired station number.



3. Turn the **Lower Line** knob to change the percentage in increments from +25 % to –50%.
For example, increase station 1 by 05%.



Note: Using the **Review** function in conjunction with **Adjust** function provides a convenient reference of actual station operating values before and after the calculated adjustments.

4. Turn the **Function Selector** knob to **REVIEW**. The display will show all current operating information for station **01**.

The calculated program changes for the station will be displayed. In this example, a **+05**% adjustment resulted in a Cycle time increase from **11.9** minutes to **12.5** minutes.

Note: When an increase adjustment is made, the controller automatically calculates a program solution that provides an increase in watering without exceeding the soil's capacity to absorb and hold water (resulting in runoff). In the example above, simply increasing the Cycle time provided the solution. If an increase in Cycle time would exceed the runoff point, a decrease in Cycle time accompanied by an increase in watering frequency (either by increased active days or watering cycles per day) could result.

Adjust the Watering Frequeny (Automatic mode only)

Stations assigned to an **Automatic** program mode can be adjusted for watering day frequency and depletion rate. For example, you may need to water more often with new turf while the root depth is shallow. This adjustment feature enables an increase or decrease in active watering days using the **Managed Allowable Depletion** (**MAD**) value for reference. The **Day Frequency** is adjustable from -30% to +30% in 5% increments. The resulting **MAD** value ranges between 20% to 80% (**50% = no change**).

1. Turn the **Function Selector** knob to **ADJUST** to view the following default display:

```
ADJUST
Water Amount
```

2. Turn the **Lower Line** knob right one stop to view the following display:

```
ADJUST
Day Frequency/Depletion
```

3. Turn the **Upper Line** knob to select the desired station number.

```
ADJUST DAYS (MAD) STA 01
  0% = No Change  (50%)
```

Note: If the selected station number is assigned to a User program mode, the following display will be shown:

```
ADJUST DAYS (MAD) STA 06
Non-Adjustable Mode
```

4. Turn the **Lower Line** knob to adjust the value from -30% to +30%. The example below shows the display with station 1 increased 10%.

```
ADJUST DAYS (MAD) STA 01
+10% = More Often  (40%)
```

Using the Rain Pause Function

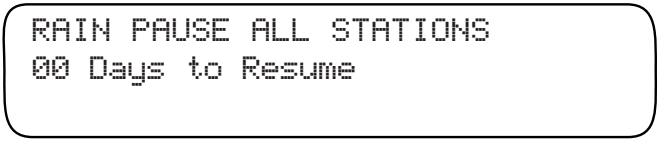
Use the **RAIN PAUSE** function to delay scheduled watering for up to 14 days. When the delay period has ended, the controller will resume normal scheduled operation.

Note: Stations with **None** selected for the **Usable Rainfall** value are not affected by the **Rain Pause** delay and will continue to operate as programmed.

Note: Manual watering operations can be used while the controller is in the **Rain Pause** mode.

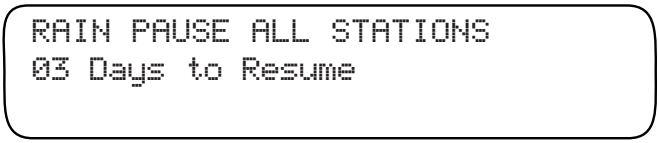
Note: The Intelli-Sense is designed to operate in conjunction with an external rain sensor. Toro Rain Sensor models TWRS and TWRFS (rain/freeze sensor) are specifically designed for Toro controllers and are available from all authorized Toro distributors. See "Connecting a Rain Sensor" on page 74 for additional information.

1. Turn the **Function Selector** knob to **RAIN PAUSE** to view the following display:

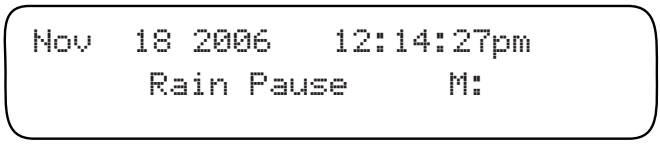


2. To initiate the **Rain Pause** mode, turn the **Lower Line** knob to select **1 – 14** days.

   Note: The controller counts down one day each time the clock time passes Midnight. If **Rain Pause** is set for **01** day, it will be released at Midnight, enabeling watering to resume the next day as scheduled. The remaining number of days until scheduled watering resumes will be displayed while the **Rain Pause** function is selected. The example below indicates three days remaining until watering resumes.



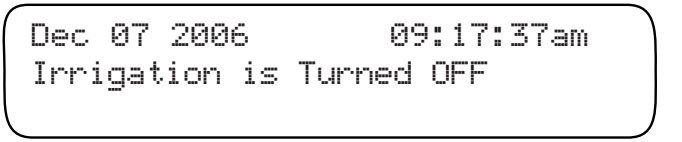
3. Turning the **Function Selector** knob to the **RUN** position will display **Rain Pause** while automatic controller operation is on hold.



Using the OFF Function

Once the **Function Selector** knob is turned to **OFF** and remains in this position for at least one second, all active watering operation will stop. Turning the **Function Selector** knob to any other position removes the controller from the **Off** mode.

To turn off the controller, turn the **Function Selector** knob to **OFF**.

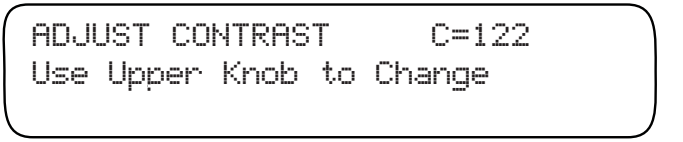


Note: For extended shutdown of the irrigation system, leave the **Function Selector** knob in the **OFF** position. No automatic watering can occur, but all other controller functions will be maintained.

Using Display Adjust Function

Use the **DISPLAY ADJUST** function to inrease or decrease the display contrast for optimum viewing.

1. Turn the **Function Selector** knob to **DISPLAY ADJUST** to view the following display:



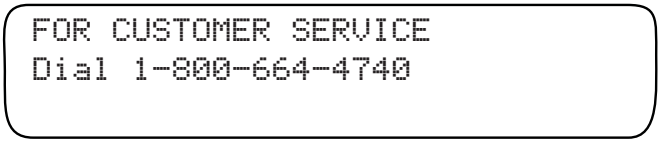
2. Turn the **Upper Line** knob right to increase or left to decrease the contrast as preferred.

Using the Help Function

If a controller problem can not be resolved using the troubleshooting steps provided in Appendix A, contact Toro Customer Support at 1-800-664-4740, Monday – Friday, 7:30 a.m. to 4:00 p.m. (PST).

During the service call, you may be asked to review and adjust various controller settings to help diagnose and resolve the problem.

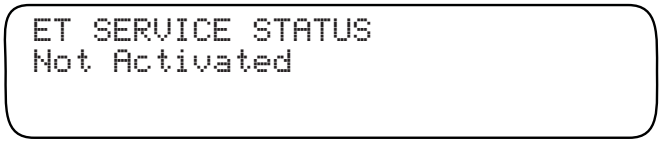
1. Turn the **Function Selector** knob to **HELP t**o view the following display.



2. Within the **HELP** menu, turn the **Upper Line** knob to select the remaining **Help** menu items in the following order:
   - **ET Everywhere Service Status**
   - **Serial and Version Numbers**
   - **Controller Status**
   - **Radio Antenna Option**
   - **Microzone Number Data**
   - **Phase Integrity Data**
   - **Lock Phase Selection**
   - **Beep on Message Selection**
   - **Data Encription Mask Report**
   - **Runtime Valve Test Option**
   - **Valve Output Test**
   - **Group Number Data**
   - **Rain Service Status**

ET Everywhere Service Status

1. Within the **Help** menu, turn the **Upper Line** knob to view the following display (example):



   The display will indicate **Activated** when the ET Everywhere service is implemented.

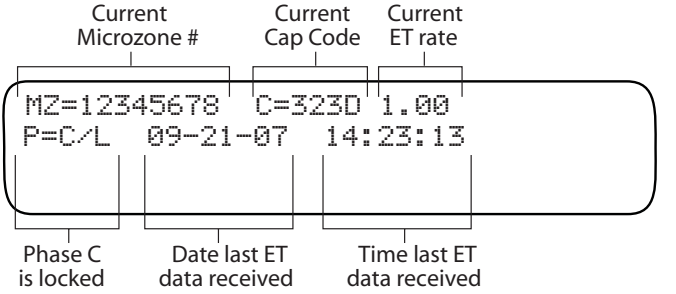
Serial and Version Numbers

1. Within the **Help** menu, turn the **Upper Line** knob to view the following display (example only):

```
Serial #: 00990005
Version:  WT.10.0us4
```

Controller Status

1. Within the **Help** menu, turn the **Upper Line** knob to view the following display:



Radio Antenna Option

Due to variations in installation and location, the controller's built-in antenna may not provide sufficient reception. An external antenna kit (102-4482) is available from authorized Toro distributors to help resolve signal reception problems. For additional information, refer to "**Installing an External Antenna"** on page **77**.

1. Within the **Help** menu, turn the **Upper Line** knob to view the following display:

```
RADIO ANTENNA
Internal
```

2. **Internal** antenna is selected by default. To select **External** antenna, turn the **Lower Line** knob.

Microzone Number

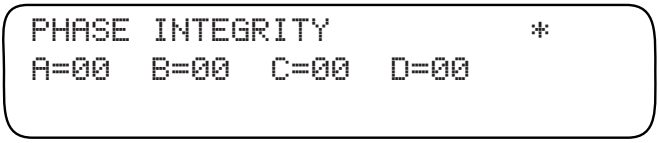
The **Microzone** number identifies the location of the controller and enables it to receive specific ET Everywhere data. This number is downloaded automatically during the ET Everywhere service activation.

1. Within the **Help** menu, turn the **Upper Line** knob to view the following display:

The default number will be initially displayed. During ET Everywherer service activation, the actual microzone number will be automatically downloaded.

Phase Integrity

1. Within the **Help** menu, turn the **Upper Line** knob to view the following display:



The controller will begin acquiring signal strength data which will be displayed next to each of the identifiers (A, B, C and D). This information will be used during the initial ET Everywhere setup process to identify the strongest signal.

Lock Phase

Note: At the time of ET Everywhere Service activation, you will be assisted by a WeatherTRAK customer support representative in the Lock Phase selection procedure. Do not change the default setting until that time.

1. Within the **Help** menu, turn the **Upper Line** knob to view the following display:

2. Turn the **Lower Line** knob to select the appropriate Phase identifier (A, B, C, D or None).

Beep on Message?

1. Within the **Help** menu, turn the **Upper Line** knob to view the following display:

2. By default, **Beep On Message** turned off. To turn **Beep On Message** on, turn the **Lower Line** knob to select **Yes**.

Note: If **Yes** is selected, it will automatically revert to **No** at Midnight if **Phase Lock** has not been set. Once Phase Lock has been set, **Beep on Message** will be automatically turned on.

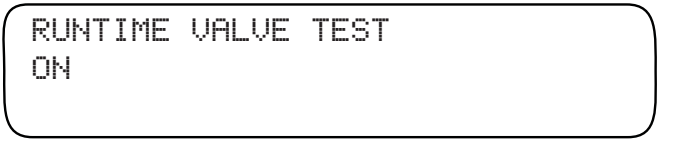
Data Encryption Mask

1. Within the **Help** menu, turn the **Upper Line** knob to view the following display (example):

Runtime Valve Test

This feature automatically checks the condition of each valve during operation. If a problem exists, the affected station number(s) and type of problem will be indicated.

1. Within the **HELP** menu, turn the **Upper Line** knob to view the following display:



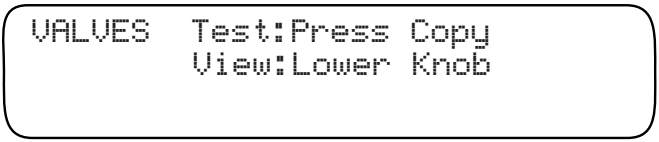
2. By default, the Runtime Valve Test feature is **ON**. To disable the test, turn the **Lower Line** knob to select **OFF**.

Manual Valve Test

This feature enables you to easily test the controller installation for existing valve connections and valve condition status.

Note: The **Valve Test** feature cannot be used while any station is operating, either automatically or manually.

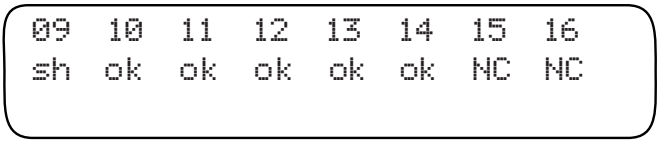
1. Within the **Help** menu, turn the **Upper Line** knob to view the following display:



2. Turn the **Lower Line** knob right one stop to view the following display:

3. To start the **Valve Test**, press the **COPY** button.

4. Turn the **Lower Line** knob right one stop to move to the next set of valves, as in the following display (example):



The lower line displays the current status of each station as follows:

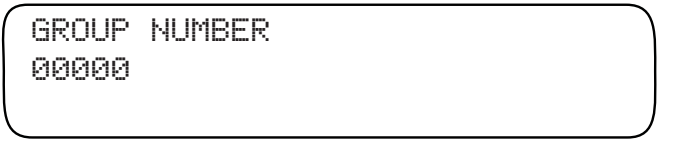
ok - Valve connected and functioning properly.
sh - Short circuit - load exceeds maximum amperage allowed.
NC - Not connected - No valve connection detected.

Note: If two consecutive stations are indicating a short-circuit condition, the cause may by due to two exposed valve wires making contact at the terminal block connection screws.

5. Repeat step 4 as needed to for remaining stations.

Group Number

1. Within the **Help** menu, turn the **Upper Line** knob to view the following display:



The lower line of the display shows the default setting. When the **Group** number is activated, it will be displayed automatically.

Rain Service Status

WeatherTRAK **Rain Service** is an optional feature (available in some locations at additional cost) that factors current rainfall into the ET Everywhere data update. For complete information regarding this service, contact WeatherTRAK customer support at **1-800-362-8774**.

1. Within the **Help** menu, turn the **Upper Line** knob to view the following display:

NO is selected by default. The display will automatically indicate **YES** when **Rain Service** has been activated.

Using the Alerts Function

The ALERTS function provides the operating status information and access to four essential components of the Intelli-Sense control system. If a problem occurs with any of these components, an alert message is immediately displayed to help determine and resolve the problem.

1. Turn the **Function Selector** knob to **ALERTS** to view the following display:

The four monitored control components are abbreviated as follows:

- **WND - Water Window**
- **DAY - Watering Day Schedule**
- **COM - ET Everywhere Service Communicaton**
- **VAL - Valve Operation**

If an Alert condition occurs, the source of the problem is identified below the related control component in the Alert display.
Once the problem condition has been resolved, the Alert message will be turned off.

Water Window Alert

The following Alert display example indicates a problem condition has occured in the **Water Window** setup in **Schedule U**.

2. Turn the **Lower Line** dial to view the following display:

```
WATER WINDOW        SCH U
1379 Min (37 Min Over)
```

The alert is generated because the combined operating time required for all stations assigned to Schedule U is 35 minutes more than the time allotted by the Water Window (1379 minutes).

One or all of the following corrective measures could be used to resolve this alert condition:

- **Increase the Water Window duration**
- **Reduce the station run time**
- **Reduce the station soak time**
- **Reduce the number of cycles**
- **Use the ADJUST function to decrease watering.**

Day Pattern Alert

The following Alert display example indicates a problem condition has occured for **Automatic Schedule A** related to the **Day Pattern** setting.

```
ALERTS  WND DAY COM VAL
        --- A-- --- ---
ALERT:  See Alert Menu
```

1. To resolve the problem, turn the **Upper Line** dial to view the following display:

```
DAY PATTERN STATUS
02  Stations in Alert
```

2. Turn the **Lower Line** dial to view the following display:

```
DAY PATTERN STATUS STA01
Sep:Need 02 Irr Days
```

This Alert display example indicates that Station 1 needs at least two irrigation days for the amount of irrigation required.

3. Turn the **Lower Line** knob to view other stations that affected by the alert condition.

4. To resolve the Day Pattern Alert, simply increase the number of watering days for the affected station numbers. When the condition has been resolved, the Alert message will be turned off.

Communication Alert

This alert appears if the ET Everwhere service has failed to communicate with the controller for a period of four consecutive days. During this time, the controller will use the last ET data received from the ET Everywhere service to calculate operating requirements. After four days, the Maximum Backup ET value entered in the **Setup** function will be used for ET calulation and an Alert message will be displayed as shown in the following example:

```
COMMUNICATION STATUS
COMMUNICATION LOST
STATUS: WARNING SEE ALERT
```

Note: In addition to the Alert display, an audible beep tone will be sounded every 30 seconds (if B**eep on Message** is turned on).

To resolve the **Communication Alert**, contact WeatherTRAK customer support at **1-800-362-8874** for assistance.

Valve Alert

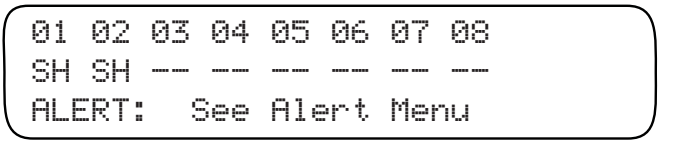
The following **Alert** display example indicates a valve output problem has occured on two stations.

```
ALERTS  WND DAY COM VAL
        --- --- --- 002
ALERT:  See Alert Menu
```

1. To resolve the problem, turn the **Upper Line** dial to view the following display:

```
VALVE FAILURE
# failed valves: 02
ALERT:  See Alert Menu
```

2. Turn the Lower Line knob as needed to display the affected station numbers.



3. A short circuit condition is indicated on stations 01 and 02. To view additional stations, continue to turn the **Lower Line** knob.

4. To resolve the problem, check the wiring connections and solenoid condition of the affected valve and take the appropriate corrective measures.

5. To turn off the **Alert** message, press the **COPY** button.

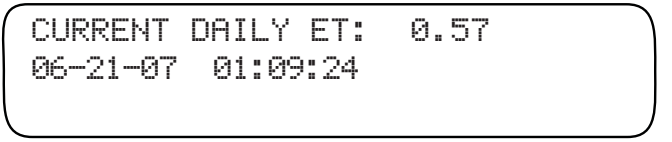
   Note: Pressing the COPY button merely turns off the Alert message. The **Alert** function display will continue to indicate the valve conditionuntil the controller has performed a watering cycle, either automatically or manually, and the alert condition is no longer present.

Using the ET Function

The display screens provided within the **ET** function enable the current **ET** values for daily and weekly watering operations to be reviewed and the **Kc** factor of Custom Turf and Plants to be adjusted.

Viewing the Current Daily and Average Weekly ET Values

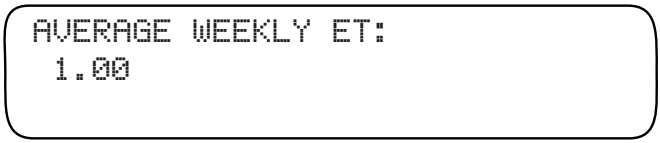
1. Turn the **Function Selector** knob to the **ET** position to view the following display (example):



   In this example, the **Current Daily ET** value being used by the controller to calculate watering is **0.57**. The lower lines shows the date and time the last **ET** data download.

   Note: ET data that is currently pending download will be indicated with the letter "**P**."

2. Turn the **Upper Line** knob right one stop to view the **Average Weekly ET** value as shown the following display (example):

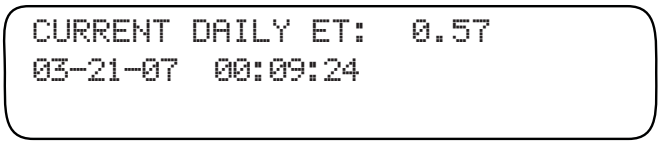


Adjusting Custom Plant Kc Factor

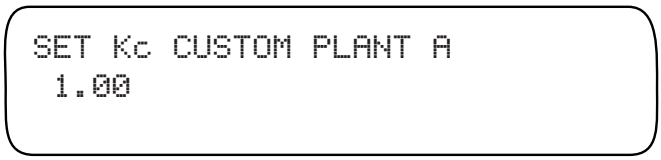
When Custom Turf or Plants are selected as the Plant Type in an Automatic program mode setup, the **Kc** factor can be adjusted within the **ET** function.

The **Kc** factor is a mathematical notation for "Crop Coefficient" based on a specific type of plant. For example, most native plants use less water than most non-native plants and will generally have a lower **Kc** factor.

1. Turn the **Function Selector** knob to the **ET** position to view the following display (example):



2. Turn the **Upper Line** knob right to view the average weekly **Kc** factor for Custom Plant A, B or Custom Turf (select by month).



3. Turn the **Lower Line** knob to adjust the factor from **0.10 – 1.20**.

Using the Manual Watering Function

Manual operation enables operation of all stations (in sequence) or individual station(s) at any time. Manual operation lasts for a specified number of minutes and starts immediately, whether or not the current day is a scheduled watering day. Only one station can be on at a time when operating manually.

Manually Operate Specific Stations

1. Turn the **Function Selector** knob to **MANUAL** to view the following display:

```
MANUAL WATER
Specific Stations
```

2. Turn the **Upper Line** knob to select the station number as shown in the following display (example):

```
MANUAL WATER  SET STA 01
00.0 Minutes
```

3. Turn the **Lower Line** knob to select manual operating time from **1 – 99** minutes in one-minute increments.

```
MANUAL WATER  SET STA 01
20.0 Minutes      NOW ON
```

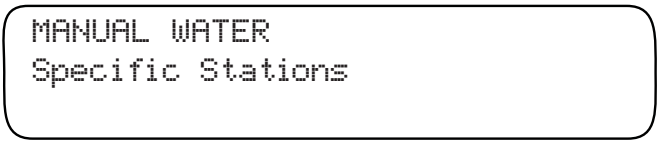
   The station cycle time will count down in 10th's of a minute. The station will shut off when the cycle time counts down (or is adjusted down) to **00.0** minutes.

4. Repeat steps 2 and 3 to select additional stations for manual operation. Each station placed in queue will operate one at a time in numerical sequence as the preceding station times out and shuts off.

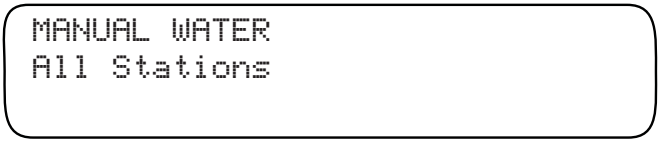
   Note: To terminate operation, either reduce the station runtime to **00.0** or turn the **Function Selector** knob momentarily to the **OFF** position.

Manually Operate All Stations

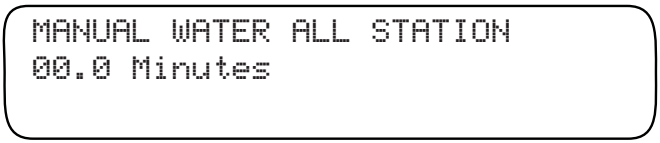
1. Turn the **Function Selector** knob to **MANUAL** to view the following display:



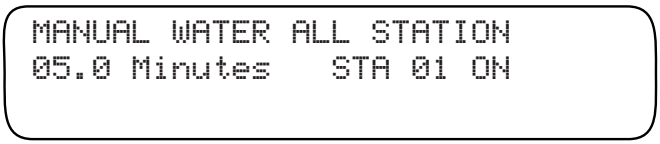
2. Turn the **Lower Line** knob to view the following display:



3. Turn the **Upper Line** knob to select the following display:



4. Turn the **Lower Line** knob to select manual operating time from **01 – 99** minutes in one-minute increments.



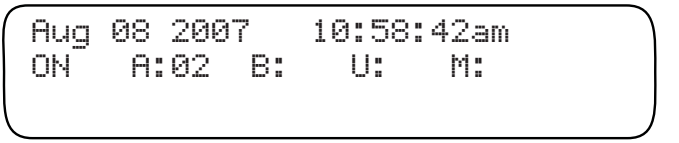
The station runtime will count down in 10th's of a minute. The station will shut off when the runtime counts down (or is adjusted down) to 00.0 minutes. Each station will operate in sequence for the selected runtime.

Note: To terminate operation, either reduce the station runtime to **00.0** or turn the **Function Selector** knob momentarily to the **OFF** position.

The Run Function

RUN is the Function Selector knob position for normal controller operations. However, automatic controller operation will occur when the Function Selector knob is in any position other than **OFF**.

1. Turn the **Function Selector** knob to **RUN** to view the following display (example):



The current **date** and **time** will be displayed on the upper line. The lower line will indicate any station number, i.e., station Station 02 in Program A, currently operating either automatically or manually.

Note: When operation of the Master Valve (MV) circuit is enabled within the **Setup** function, it will be energized in conjunction with any active watering station. A separate indication for Master Valve operation is not displayed.

Appendix A
Troubleshooting Guide

The landscape is too dry.

1. Turn the **Function Selector** knob to **ADJUST**.
2. Turn the **Upper Line** knob to select a station.
3. Turn **Lower Line** knob to adjust +5% and watch for 7 to 10 days.
4. If your landscape is still too dry, increase 5% each week until stress is eliminated. This is the optimal level.

The landscape is too wet.

1. Turn the **Function Selector** knob to **ADJUST**.
2. Turn the **Upper Line** knob to select a station.
3. Turn the **Lower Line** knob to adjust -10% and watch your landscape for 7 to 10 days.
4. If your landscape is still too wet, decrease 5% to 10% each week until you see minor stress in you landscape.
5. When you see minor stress in your landscape, increase 5% to set program at optimal level.

The controller continues to "Beep."

1. Turn the **Function Selector** knob to **RUN**.
2. Make sure the date and time settings are correct.
3. **Phase(X)(L)** (where X = the Phase identifier and L = Locked) will be displayed. The **Beep on Message** alert tone option is automatically turned **On** during the ET Everywhere activaton process. The alert tone will automatically turn off at midnight.
4. Turn the **Function Selector** knob to **HELP.**
5. Turn the **Upper Line** knob select **BEEP on MESSAGE?** from the **Help** menu.
6. Turn the **Lower Line** knob to select **No**.
7. Turn the **Function Selector** knob to **RUN**.

The display is blank.

1. Power to the controller has been disconnected, either by a blown fuse or at the AC power source circuit breaker panel. Check fuse condition, referring to the procedure on **page 76**. Check the circuit breaker at the power source and reset as necessary.

2. If the display does not return, contact Irriitrol Customer Support at **1-800-634-8873**.

The controller programs correctly but does not operate automatically.

1. Confirm the controller clock is synchronized with the current time and date. If the controller clock is wrong, watering may not occur as expected.

2. If **Rain Switch** is displayed, the Rain Sensor circuit has placed automatic operation on hold. If a Rain Sensor is not installed, confirm the **Sensor** switch is in the **Bypass** position. Check the Sensor wiring terminals to verify installation of a jumper wire connecting the terminals.

The ADJUST Function appears to be ineffective.

1. Make sure the date and time settings are correct.

2. Turn the **Function Selector** knob to **REVIEW**.

   Changes made within the **Adjust** function may be very subtle, resulting in minor changes to the cycle time or number of cycles, or it may be more significant depending on the percent adjustment. If it is currently Wednesday or later in the week when reviewing the schedule, the affect of the adjustment may not be evident in the Week 1 display. You should see the effect of **Adjust** in the Watering Day schedules of Weeks 2 – 8.

Week 1 of the watering day schedule appears incomplete.

1. The days prior to installation will not be shown in the Week 1 schedule. The controller shows what days have irrigated or it anticipates what days will irrigate if the weather remains as it is today. If the controller is installed on a Friday, there will be no irrigation days shown prior to Friday, which may result in no irrigation days at all for Week 1.

2. Turn the **Lower Line** knob to see irrigation day schedules for Week 2 – 8. The irrigation days will display a pattern as you step through the subsequent displays.

The REVIEW display indicates 99+ minutes.

1. Since the displayed cycle time is limited to two digits, 99+ is shown when the total programmed cycle time is greater than 99 minutes. This display does not indicate a controller malfunction.

Notes

Appendix B
Gathering Site Data

Introduction

One of the parameters a user must enter to calculate an efficient schedule is a precipitation rate (PR). The following outlined processes enable a user to gather site information to determine a base precipitation rate for each station. Fine-tuning this precipitation rate may be necessary if the irrigation system was not installed to exact manufacturer's standards.

As with any irrigation schedule, an initial calculation of the program is performed and then adjustments are made to fine-tune the amount of water used to properly maintain the landscape.

Fine-tuning is vital to obtaining an accurate and efficient watering program for each area of the landscape. The adjustment process requires a base program based on as much information about the landscape as possible. The base program is then adjusted up or down according to the landscape response to the program over a period of time. The ultimate goal is to decrease watering to the point of just slight plant stress, then increase watering slightly to maintain the plants just above this point.

Using this fine-tuning method will produce and maintain heathier, well adapted plants with minimal water usage.

Site Data Gathering Process

Review System Installation

Make note of the following:

1. A descriptive name for each active station on the controller.
2. The manufacturer of the irrigation nozzles on each station.
3. The spacing of heads for each station, based on general observation only.
4. The pressure at the heads (based on general observation).
5. For retrofit applications, the age of the irrigation system components, especially the sprinkler nozzles and piping. The performance of these components is likely to degrade over time.
6. All other station properties are gathered and indicated on the Irrigation System Profile Worksheet.

Enter the Station Precipitation Rate in the Controller

1. If the precipitation rate of the station is known from an irrigation design or other calculation, enter it in the station's properties. This is most common with new irrigation installations.
2. If the precipitation rate is not known, such as in the case of a retrofit installation, set the station's sprinkler type to the type of heads that are installed on that station. The controller will set a default precipitation rate for you.

Follow-up Site Visits

1. Closely check the conditions of the landscape. Look for stress in the plant material or other signs of under-watering or over-watering, such as soggy areas or puddles immediately after irrigation applications.

2. Use a soil probe to check the depth of moist soil as evidence of the depth the irrigation program is producing. This is very important in areas showing signs of stress and areas where there may be too much water. This information will help in defining which of the following steps should be taken to fine-tune the irrigation program.

3. If the landscape is green with no signs of stress, the schedule is adjusted down 10% and monitored. If it is still green with no signs of stress after one week, it is adjusted down 10% again. This process continues every week until the landscape shows signs of stress and then the schedule is adjusted up 5% for a final adjustment.

4. If the landscape is visibly wet with extremely wet soil, puddles and runoff, the initial adjustment may need to be adjusted 10% or 15% down for the first one-week adjustment period and then the process follows the downward 5% adjustment every week until minor stress is visible. Once minor stress is noticed, adjust the schedule back up 5% for a final adjustment.

5. If the landscape shows signs of stress and very dry soil with the base schedule and continues to show stress following an initial 5% increase, then continue making 5% increases each week until the landscape shows no signs of stress.

6. If the landscape is extremely dry or extremely wet, an adjustment in the precipitation rate may be required. The following steps will help you identify a proper precipitation rate for your system.

Compare Site Conditions to Product Specifications

1. Do the heads have head-to-head coverage? Does one head spray coverage exactly reach the next head (no more, no less)?
   If **YES**, go to next step. If **NO,** go to **Step 3**.

2. Do you have access to the manufacturer's sprinkler nozzle data?
   If **YES**, go to **Process 1** on **page 70**. If **NO**, go to **Step 3**.

3. Do the heads produce a lot of misting spray (a sign of too much pressure)?
   If **YES**, go to **Process 3** on **page 70**. If NO, go to **Step 4**.

4. Is the system less than 10 years old?
   If **YES**, go to **Process 2** on **page 70**. If NO, go **Process 3**.

Process 1: Manufacturer's Charts and PR Calculations

1. Determine if the head layout is in a square or triangular pattern.

2. Verify that you have head-to-head coverage and the nozzles are installed for matched precipitation; a general rule of thumb is: as the spray arc doubles, so should the flow.

3. You can use the manufacturer's PR rates if you have fixed spray nozzles within the same radius family or if you have rotors/impacts that are all 180° arcs with the same nozzles.

4. If you have matched PR nozzles, use this formula for square spacing:

   PR = [GPM (for any arc) x 34,650] ÷ [Degree of Arc x Head Spacing (ft.) x Row Spacing (ft.)]

   If you have matched PR nozzles, use this formula for triangular spacing:

   PR = [GPM of 360° arc x 96.25] ÷ [Head Spacing (ft.) x Head Spacing (ft.) x .866]

5. Enter PR data into the controller.

Process 2: Station Catch Can Audit

Perform a system audit per the Irrigation Association's Certified Landscape IrrigationAuditor (CLIA) criteria. For information on the CLIA program, contact the Irrigation Association at: www.irrigation.org.

Process 3: Sprinkler Type Default

1. If the first two processes are not possible, then set the controller to the default precipitation rate for each zone's sprinkler type.

2. Process to use the defaults:
   - In the programming process, select the sprinkler type for the desired zone.
   - Turn the **Upper Line** knob to set the precipitation rate. do not change the default setting.
   - Continue with programming the station.

Appendix C
InstallationProcedures

Installing the Controller Cabinet

For safe, reliable operation, select an installation site for the controller that will provide the following conditions:

Indoor Models:

- An enclosed or sheltered area, protected from all weather elements and direct sunlight.
- Access to a grounded, 120 VAC wall receptacle on a branch circuit that is not controlled by a light switch or utilized by a major appliance.
- Access to the control valve wiring.

Outdoor Models:

- Protected from direct exposure to irrigation spray, afternoon sun, wind and snow.
- Access to a grounded 120 VAC branch circuit that is not controlled by a light switch or utilized by a major appliance.
- Access to the sprinkler control valve wiring.

1. Open the controller door. On the outdoor model, press the control module latch to the right. Swing the hinged control module outward from right to left.

   Note: On the outdoor cabinet, the lower mounting pilot holes are flashed over. If screw anchors are to be installed, remove the flash from one or both pilot holes as needed using a ¼" drill bit.

   Note: Screw anchors must be used when the controller is installed on drywall or masonry. Temporarily position the controller on the wall, mark the mounting hole locations and install the screw anchors.

2. Install the top mounting screw leaving approximately ¼" of the screw shaft exposed.
3. Align the keyhole on the cabinet back panel with the screw head. Slide the controller downward to capture the screw shaft in the keyhole slot.

   Note: Adjusting the screw depth may be required to enable the controller to fully engage the mounting screw.

4. Install the lower mounting screw(s) to secure the controller cabinet.

   Note: The field wiring access hole in the base of the Outdoor controller cabinet accepts 1¼" conduit and the Indoor cabinet accepts ¾" conduit. Install conduit at this time if required by local electrical codes.

Connecting the Control Valves

Note: Using 18 AWG, multi-strand, direct-burial irrigation valve connection cable is recommended. Select a cable that provides at least one wire for each valve and one extra wire for the valve common connection.

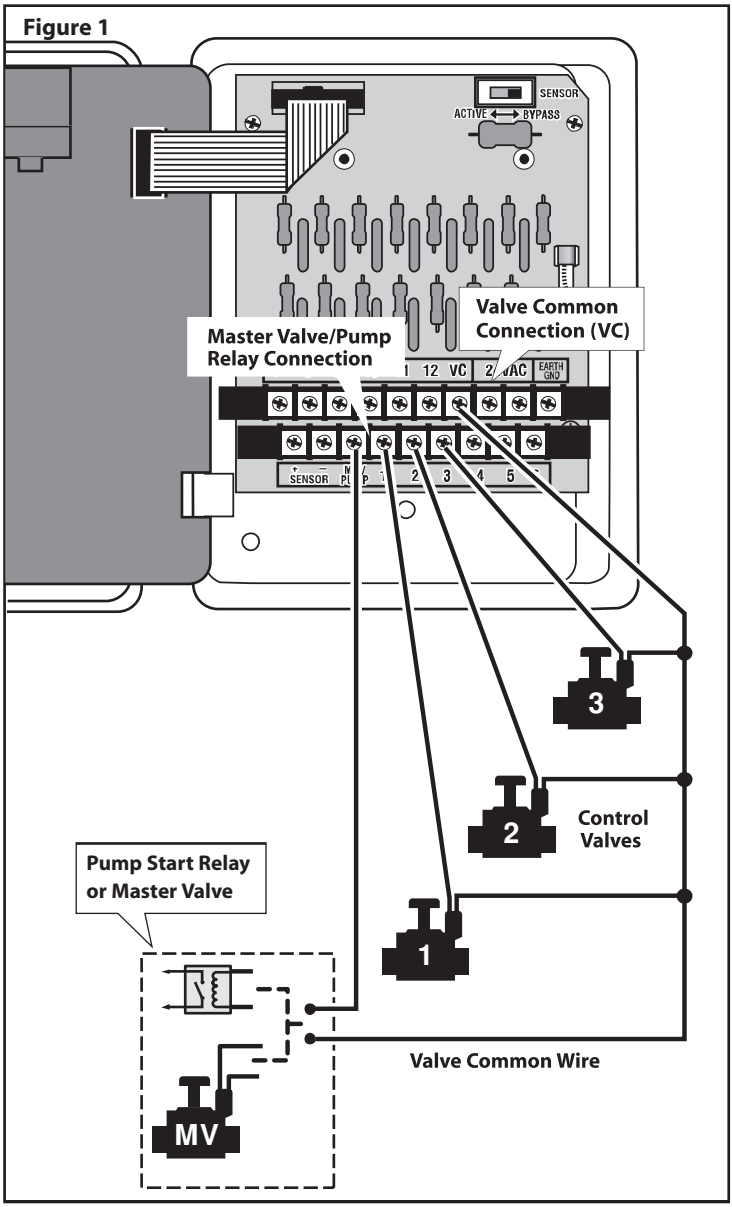
⚠ CAUTION: To prevent corrosion and possible short circuit, use waterproof wire connectors on all wire splices.

1. To provide the valve common connection, splice one cable wire (generally the white wire) to one solenoid lead from each valve.
2. Connect a separate wire to the remaining solenoid lead of each valve. For reference, note the wire color used for each valve connection and it's associated watering zone.
3. If a master valve or pump start relay is used, make this connection in the same manner.

⚠ CAUTION: The pump start relay must be rated 24 VAC at 0.35A maximum. Never connect the pump directly to the controller.

4. Route the wire cable into the controller through the large opening in the base of the housing or through conduit (if installed).
5. Leave 8" of cable remaining inside the cabinet. Remove the outer cable sheath to expose about 6" of wire. Strip ½" insulation from each wire to be connected.
6. Secure the valve common wire to terminal "**VC**" and each valve wire to the applicable station number terminal. See **Figure 1**.

Figure 1

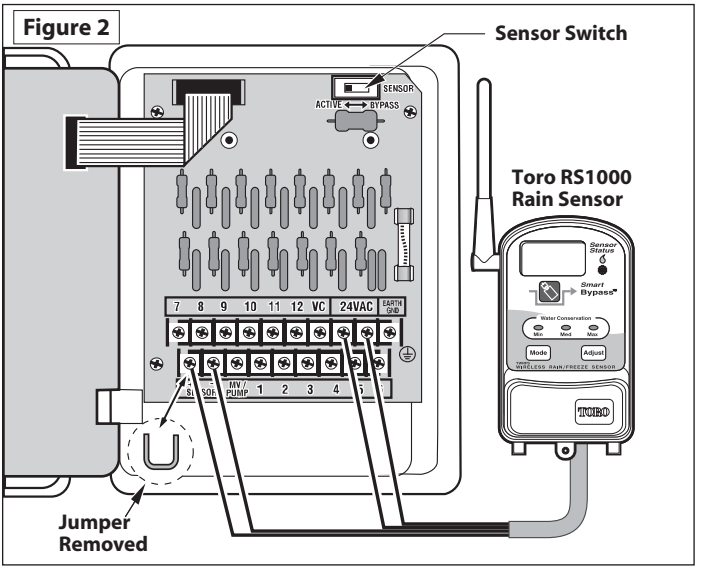

SENSOR
ACTIVE
BYPASS
Valve Common
Connection (VC)
Master Valve/Pump
Relay Connection
12 VC
EARTH
GND
SENSOR
1
2
3
4
5
3
2
Control
Valves
Pump Start Relay
or Master Valve
1
Valve Common Wire
MV

Connecting a Rain Sensor

⚠ Important: The sensor circuit is designed for a Normally Closed rain sensor. If a rain sensor is NOT connected, the Sensor switch must be in the "Bypass" position or the jumper wire must be installed across the sensor terminals.

If the jumper wire is removed and the Sensor switch is in the "Active" position, the controller will not run automatically.

1. Insert in the sensor connection cable through the bottom of the cabinet.
2. Remove the jumper wire from the "**Sensor**" terminals. Refer to the installation instructions included with the Rain Sensor and connect wires accordingly. See **Figure 2**.



3. Place the Sensor switch in the "**Active**" position.

Note: Operation of the Rain Sensor does not disable reception of the ET Everywhere service or Manual controller operations. When the sensor circuit is activated, the controller will continue to operate for a short period of time before Automatic operation is suspended. Automatic operation will resume when sensor input is terminated or the Sensor switch is placed in the Bypass position.

Connecting the Indoor Model Power Source and Earth Ground for Indoor and Outdoor Models

1. Route the plug-in transformer cable through the small hole provided in the cabinet bottom and connect to the terminals labeled "**24 VAC**."

   ⚠ CAUTION: The controller's surge protection circuitry must have an earth ground path to function properly. A proper earth ground connection is very important in lightning-prone areas.

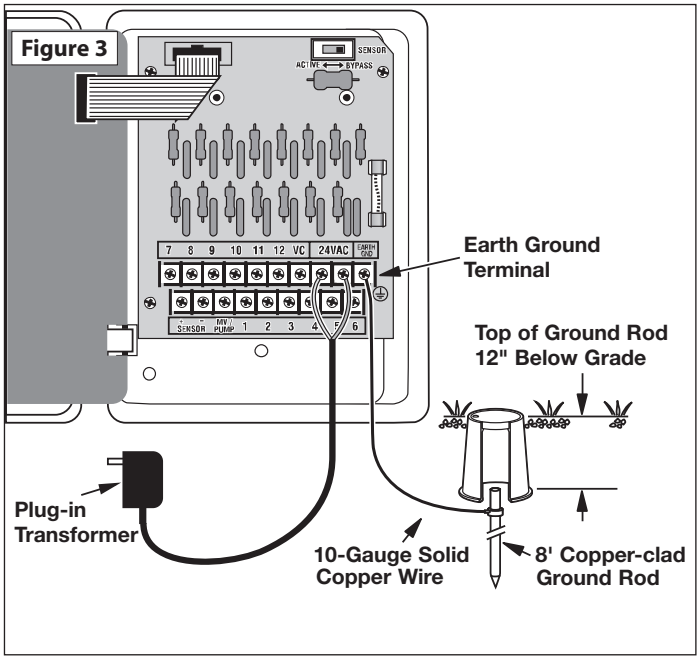
2. Install an 8' copper-clad ground rod into well-moistened soil to about 12" below grade. Connect a 10 AWG solid copper ground wire and route to the controller in the most direct path, avoiding bends smaller than a 12" radius.

   Note: Using a small valve box to cover the ground rod is recommended.

3. Route the ground wire through the bottom of the cabinet and connect to the "**EARTH GND**" terminal.

4. Close the control module and plug the transformer into a wall outlet.

   Note: To adjust the controller display contrast, see **"Display Adjust Function"** on page **48**.

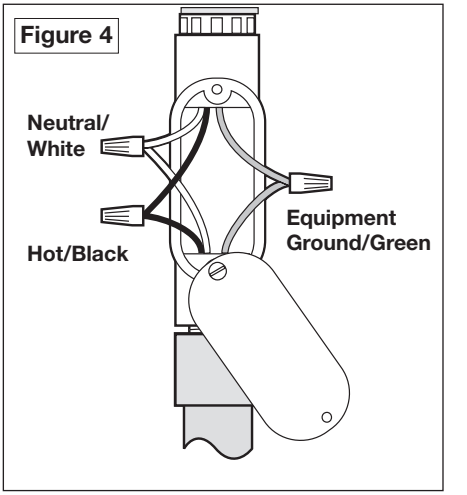


Connecting the Outdoor Model Power Source

WARNING: All electrical components must meet applicable national and local electrical codes including installation by qualified personnel. These codes may require a means in the fixed wiring of disconnecting AC power having a contact separation of at least 0.120" in the line and neutral poles. Ensure the AC power source is OFF prior to connecting to the controller. The wire used for connection must have insulation rated at 105°C minimum.

1. For input power wire connections, install a ½" NPT threaded conduit body to the transformer assembly nipple. From the conduit body, install electrical conduit to the 120 VAC power source.
2. Confirm that power has been disconnected at the source by using a volt meter or voltage detector.
3. Route solid copper 14-AWG power, neutral and equipment ground wires through conduit from the power source into the conduit body.
4. Using the supplied wire nuts, connect the power wire to Black, neutral wire to White and equipment Ground to Green controller wire. See **Figure 4**.
5. Close and secure the conduit cover.
6. Referring to the grounding procedures on page **75**, install and connect an earth ground wire.
7. Apply power to the controller.

   Note: To adjust the controller display contrast, see "**Display Adjust Function**" on page **48**.



Installing an External Antenna

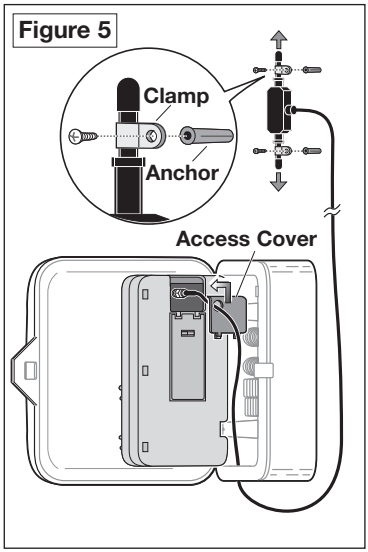
The optional external antenna kit (part number 102-4482) is designed to increase radio signal reception strength in installation sites where the controller's built-in antenna may not be adequate. The antenna can be installed either indoors or out and includes installation hardware.

To obtain maximum radio signal reception strength:

- Install the antenna with the extensions aligned vertically as shown in **Figure 5** below.
- Install the antenna as high as possible, ensuring the cable can reach the controller with without straining the connection.
- Avoid installing the antenna near a transformer or electric motor.

1. Place a plastic cable clamp on each antenna extension.
2. Position the antenna on the wall and mark the cable clamp screw hole locations.
3. Drill two 7/32" pilot holes into the wall and install the screw anchors.
4. Secure the antenna to the wall using the two phillips head screws.
5. Open the controller cabinet door. Press the control module release tab to the right (outdoor model only) and swing the control module outward.
6. Route the antenna cable to the controller. Insert the cable through an access hole provided in the base of the cabinet.
7. The antenna cable connector is located on the back of the control module. Push the access cover in and up to remove.
8. Insert the cable connector through the hole in the replacement access cover. Attach the cable to the threaded receptacle and tighten securely by hand.
9. Install the access cover and close the control module.
10. Change the controller antenna setting from Internal to External. Refer to "**Select Radio Antenna Option**" on page **50**. Test the signal reception strength as described in "**View Phase Integrity Data**" on page **51**.

Figure 5



Fuse Replacement

▲ CAUTION: The fuse protects the transformer from overload and subsequent damage due to a short circuit condition. For continued protection against the risk of controller damage or fire, replace only with a fuse of the same type. Ensure power is OFF prior to removing/replacing the fuse.

1. Disconnect power to the controller.
2. Unlatch and swing open the control module.
3. Carefully remove the blown fuse from the PC board.
4. Clip in a new 2A Slow-Blow fuse (P/N 102-3406).
5. Close and latch the control module.
6. Restore power to the controller.

Specifications

Mechanical

- Indoor Cabinet: 7.75" H x 7" W x 3.75" D
- Outdoor Cabinet: 7.75" H x 10.75" W x 4" D
- Wiring Conduit Provisions: Field - 1.5" Auxiliary - 0.50"
- Operating Temperature Range: 32°F to 140°F (0°C to 60°C)
- Storage Temperature Range: -22°F to 149°F (-30°C to 65°C)

Electrical

- Input: 120 VAC, 50/60 Hz, 0.5A (24 W max.)
- Output (per station): 24 VAC, 50/60 Hz, 0.5A (12 VA max.)
- Output (total): 24 VAC, 50/60 Hz, 1.0A (24 VA max.)
- Master Valve/Pump Start Relay Output: 24 VAC, 0.35A (9 VA max.)
- Sensor Input: Normally-closed Rain Sensor
- Fuse: 250V, 2A, Slow-Blow

Appendix D
Glossary of Terms

ET Zone Number – A reference value used by the ET Everywhere service to group ET Microzones that have matching ET values for a given day.

Group Number – This is a code number provided by the ET Everywhere service to the Intelli-Sense controller at the time of activation. The link enables the ET Everywhere service to communicate conditions relative to controllers in locations where irrigation regulation programs are in effect. This code will only be assigned if the user is a participant in the program.

High ET Start Time – In the event of a very high ET rate, the controller will try to irrigate enough to satisfy the plants' needs. If the controller cannot accomplish this within the allotted water window time frame, an additional irrigation start time will be initiated to fulfill the watering requirements. The High ET Start Time is when the additional watering cycle start can occur.

Maximum Active Stations – This number represents the actual number of functional stations. For example, if 10 stations have valves connected, but two stations are for future system use and are currently non-functional, the maximum active station number would be eight. Selecting a higher number of stations than actually used can cause the Water Window duration to be exceeded, resulting in false condition alerts. Setting a lower number than actual will prevent some of the stations from operating.

Maximum Backup ET Value – This value is the highest ET rate expected for the year based on geographic and average weather conditions. Backup ET is a fail-safe measure used only if the daily ET Everywhere service data transmission has not been received for four consecutive days. The Backup ET value will be automatically adjusted to compensate for the current calendar month in which the interruption occurs.

Microzone Number – This value is transmitted by the ET Everywhere service at the time of activation to establish specific latitude and longitude coordinates. This process enables the ET Everywhere service to provide localized ET/weather data.

Phase Integrity Data – This reference value is used exclusively by the ET Everywhere service to determine the broadcast integrity or signal strength of three wireless network communication carriers used to broadcast the ET Everywhere service data. The highest displayed signal phase value is used for initial service activation.

Phase Lock – The Intelli-Sense receives daily weather updates from three different paging carriers. At the time of ET Everywhere service activation, the carrier with the highest signal strength is selected to ensure the best data reception and to expedite the activation process. After initial activation, the Intelli-Sense receives all carriers each night to provide redundancy for data reception.

Rain Service – This is an optional service available in a limited number of areas that enables the controller to receive rainfall information to adjust the program accordingly. Rain Service data accounts for local reported rainfall and includes it in the soil moisture depletion calculations.

Stacking – When Stacking option "Yes" is selected, the controller is constrained to run one watering schedule (A, B or U) at a time. The stations within the schedule run one at a time in numerical order until all programmed stations have completed their watering program.

When Stacking option "No" is selected, the watering schedules operate independently. Each schedule will have specific start times and a water window assignment. With stacking disabled, up to 4 stations can operate simultaneously, depending on how the schedules may overlap. If a fifth station attempts to turn on, schedule "U" will be disabled. The primary factor to consider before disabeling the Stacking feature, is if the hydraulic capacity of the irrigation system is adequate for the increased demand of concurrent multiple station operation.

Water District Number – If you are an active participant in a water agency program, you will be given a water control district identification number to enter during the ET Everywhere service activation. This five-digit code will enable the controller to be automatically notified of local agency requirements and/or restrictions.

Water Window – The Water Window is a selectable time frame ranging from 6 hours minimum to 23 hours and 59 minutes maximum per scheduled watering day. The Water Window start time marks the beginning of irrigation for the day. All stations that need to operate on the scheduled watering day must run to completion before the end of the Water Window occurs.

The Toro Promise — Limited Five-Year Warranty

The Toro Company and its affiliate, Toro Warranty Company, pursuant to an agreement between them, jointly warrants, to the owner, each new piece of equipment (featured in the current catalog at date of installation) against defects in material and workmanship for for a period described below, provided they are used for irrigation purposes under manufacturer's recommended specifications. Product failures due to acts of God (i.e., lightning, flooding, etc.) are not covered by this warranty.

Neither Toro nor Toro Warranty Company is liable for failure of products not manufactured by them even though such products may be sold or used in conjunction with Toro products.

During such warranty period, we will repair or replace, at our option, any part found to be defective. Your remedy is limited solely to the replacement or repair of defective parts.

Return the defective part to your local Toro distributor, who may be listed in your telephone directory Yellow Pages under "Irrigation Supplies" or "Sprinkler Systems," or contact The Toro Warranty Company P.O. Box 489, Riverside, California, 92502. Phone (800) 664-4740 for the location of your nearest Toro distributor or outside the U.S., call (951) 688-9221.

This warranty does not apply where equipment is used, or installation is performed in any manner contrary to Toro's specifications and instructions, nor where equipment is altered or modified.

Neither Toro nor Toro Warranty Company is liable for indirect, incidental or consequential damages in connection with the use of equipment, including but not limited to: vegetation loss, the cost of substitute equipment or services required during periods of malfunction or resulting non-use, property damage or personal injury resulting from installer's actions, whether negligent or otherwise.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

All implied warranties, including those of merchantability and fitness for use, are limited to the duration of this express warranty.

Some states do not allow limitations of how long an implied warranty lasts, so the above limitation may not apply to you.

This warranty gives you specific legal rights and you may have other rights which vary from state to state.

The Toro Intelli-Sense TIS-612 series controllers are covered by this warranty for a period of five years from the date of installation.

FCC Compliance Information

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a FCC Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the irrigation controller with respect to the receiver.
- Move the irrigation controller away from the receiver.
- Plug the irrigation controller into a different outlet so that the irrigation controller and receiver are on different branch circuits.

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